pytest Documentation

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CHAPTER

ONE

START HERE

1.1 Get Started

1.1.1 Install pytest

pytest requires: Python 3.8+ or PyPy3.

1. Run the following command in your command line:

```
pip install -U pytest
```

2. Check that you installed the correct version:

```
$ pytest --version pytest 8.3.2
```

1.1.2 Create your first test

Create a new file called test_sample.py, containing a function, and a test:

```
# content of test_sample.py
def func(x):
    return x + 1

def test_answer():
    assert func(3) == 5
```

The test

The [100%] refers to the overall progress of running all test cases. After it finishes, pytest then shows a failure report because func (3) does not return 5.



You can use the assert statement to verify test expectations. pytest's Advanced assertion introspection will intelligently report intermediate values of the assert expression so you can avoid the many names of JUnit legacy methods.

1.1.3 Run multiple tests

pytest will run all files of the form test_*.py or *_test.py in the current directory and its subdirectories. More generally, it follows *standard test discovery rules*.

1.1.4 Assert that a certain exception is raised

Use the *raises* helper to assert that some code raises an exception:

```
# content of test_sysexit.py
import pytest

def f():
    raise SystemExit(1)

def test_mytest():
    with pytest.raises(SystemExit):
    f()
```

You can also use the context provided by *raises* to assert that an expected exception is part of a raised Exception—Group:

```
# content of test_exceptiongroup.py
import pytest

def f():
    raise ExceptionGroup(
        "Group message",
        [
            RuntimeError(),
        ],
        )
```

```
def test_exception_in_group():
    with pytest.raises(ExceptionGroup) as excinfo:
        f()
    assert excinfo.group_contains(RuntimeError)
    assert not excinfo.group_contains(TypeError)
```

Execute the test function with "quiet" reporting mode:

```
$ pytest -q test_sysexit.py
.
[100%]
1 passed in 0.12s
```

1 Note

The -q/--quiet flag keeps the output brief in this and following examples.

1.1.5 Group multiple tests in a class

Once you develop multiple tests, you may want to group them into a class. pytest makes it easy to create a class containing more than one test:

```
# content of test_class.py
class TestClass:
    def test_one(self):
        x = "this"
        assert "h" in x

    def test_two(self):
        x = "hello"
        assert hasattr(x, "check")
```

pytest discovers all tests following its *Conventions for Python test discovery*, so it finds both test_prefixed functions. There is no need to subclass anything, but make sure to prefix your class with Test otherwise the class will be skipped. We can simply run the module by passing its filename:

(continues on next page)

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```
FAILED test_class.py::TestClass::test_two - AssertionError: assert False 1 failed, 1 passed in 0.12s
```

The first test passed and the second failed. You can easily see the intermediate values in the assertion to help you understand the reason for the failure.

Grouping tests in classes can be beneficial for the following reasons:

- · Test organization
- · Sharing fixtures for tests only in that particular class
- Applying marks at the class level and having them implicitly apply to all tests

Something to be aware of when grouping tests inside classes is that each test has a unique instance of the class. Having each test share the same class instance would be very detrimental to test isolation and would promote poor test practices. This is outlined below:

```
# content of test_class_demo.py
class TestClassDemoInstance:
    value = 0

def test_one(self):
        self.value = 1
        assert self.value == 1

def test_two(self):
        assert self.value == 1
```

```
$ pytest -k TestClassDemoInstance -q
.F
                                                            [100%]
_ TestClassDemoInstance.test_two _
self = <test_class_demo.TestClassDemoInstance object at 0xdeadbeef0002>
   def test two(self):
      assert self.value == 1
\mathbf{E}
      assert 0 == 1
       + where 0 = <test_class_demo.TestClassDemoInstance object at 0xdeadbeef0002>
→.value
test_class_demo.py:9: AssertionError
============ short test summary info ========================
FAILED test_class_demo.py::TestClassDemoInstance::test_two - assert 0 == 1
1 failed, 1 passed in 0.12s
```

Note that attributes added at class level are class attributes, so they will be shared between tests.

1.1.6 Request a unique temporary directory for functional tests

pytest provides Builtin fixtures/function arguments to request arbitrary resources, like a unique temporary directory:

```
# content of test_tmp_path.py
def test_needsfiles(tmp_path):
    print(tmp_path)
    assert 0
```

List the name tmp_path in the test function signature and pytest will lookup and call a fixture factory to create the resource before performing the test function call. Before the test runs, pytest creates a unique-per-test-invocation temporary directory:

More info on temporary directory handling is available at *Temporary directories and files*.

Find out what kind of builtin pytest fixtures exist with the command:

```
pytest --fixtures # shows builtin and custom fixtures
```

Note that this command omits fixtures with leading _ unless the -v option is added.

1.1.7 Continue reading

Check out additional pytest resources to help you customize tests for your unique workflow:

- "How to invoke pytest" for command line invocation examples
- "How to use pytest with an existing test suite" for working with preexisting tests
- "How to mark test functions with attributes" for information on the pytest.mark mechanism
- "Fixtures reference" for providing a functional baseline to your tests
- "Writing plugins" for managing and writing plugins
- "Good Integration Practices" for virtualenv and test layouts

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CHAPTER

TWO

HOW-TO GUIDES

2.1 How to invoke pytest



Complete pytest command-line flag reference

In general, pytest is invoked with the command pytest (see below for *other ways to invoke pytest*). This will execute all tests in all files whose names follow the form test_*.py or *_test.py in the current directory and its subdirectories. More generally, pytest follows *standard test discovery rules*.

2.1.1 Specifying which tests to run

Pytest supports several ways to run and select tests from the command-line or from a file (see below for *reading arguments from file*).

Run tests in a module

pytest test_mod.py

Run tests in a directory

pytest testing/

Run tests by keyword expressions

```
pytest -k 'MyClass and not method'
```

This will run tests which contain names that match the given *string expression* (case-insensitive), which can include Python operators that use filenames, class names and function names as variables. The example above will run <code>TestMyClass.test_method_simple</code>. Use "" instead of '' in expression when running this on Windows

Run tests by collection arguments

Pass the module filename relative to the working directory, followed by specifiers like the class name and function name separated by :: characters, and parameters from parameterization enclosed in [].

To run a specific test within a module:

pytest tests/test_mod.py::test_func

To run all tests in a class:

```
pytest tests/test_mod.py::TestClass
```

Specifying a specific test method:

```
pytest tests/test_mod.py::TestClass::test_method
```

Specifying a specific parametrization of a test:

```
pytest tests/test_mod.py::test_func[x1,y2]
```

Run tests by marker expressions

To run all tests which are decorated with the @pytest.mark.slow decorator:

```
pytest -m slow
```

To run all tests which are decorated with the annotated <code>@pytest.mark.slow(phase=1)</code> decorator, with the phase keyword argument set to 1:

```
pytest -m "slow(phase=1)"
```

For more information see *marks*.

Run tests from packages

```
pytest --pyargs pkg.testing
```

This will import pkg.testing and use its filesystem location to find and run tests from.

Read arguments from file

Added in version 8.2.

All of the above can be read from a file using the @ prefix:

```
pytest @tests_to_run.txt
```

where tests_to_run.txt contains an entry per line, e.g.:

```
tests/test_file.py
tests/test_mod.py::test_func[x1,y2]
tests/test_mod.py::TestClass
-m slow
```

This file can also be generated using pytest --collect-only -q and modified as needed.

2.1.2 Getting help on version, option names, environment variables

```
pytest --version # shows where pytest was imported from
pytest --fixtures # show available builtin function arguments
pytest -h | --help # show help on command line and config file options
```

2.1.3 Profiling test execution duration

Changed in version 6.0.

To get a list of the slowest 10 test durations over 1.0s long:

```
pytest --durations=10 --durations-min=1.0
```

By default, pytest will not show test durations that are too small (<0.005s) unless -vv is passed on the command-line.

2.1.4 Managing loading of plugins

Early loading plugins

You can early-load plugins (internal and external) explicitly in the command-line with the -p option:

```
pytest -p mypluginmodule
```

The option receives a name parameter, which can be:

- A full module dotted name, for example myproject.plugins. This dotted name must be importable.
- The entry-point name of a plugin. This is the name passed to importlib when the plugin is registered. For example to early-load the pytest-cov plugin you can use:

```
pytest -p pytest_cov
```

Disabling plugins

To disable loading specific plugins at invocation time, use the -p option together with the prefix no:.

Example: to disable loading the plugin doctest, which is responsible for executing doctest tests from text files, invoke pytest like this:

```
pytest -p no:doctest
```

2.1.5 Other ways of calling pytest

Calling pytest through python -m pytest

You can invoke testing through the Python interpreter from the command line:

```
python -m pytest [...]
```

This is almost equivalent to invoking the command line script pytest [...] directly, except that calling via python will also add the current directory to sys.path.

Calling pytest from Python code

You can invoke pytest from Python code directly:

```
retcode = pytest.main()
```

this acts as if you would call "pytest" from the command line. It will not raise SystemExit but return the exit code instead. If you don't pass it any arguments, main reads the arguments from the command line arguments of the process (sys.argv), which may be undesirable. You can pass in options and arguments explicitly:

```
retcode = pytest.main(["-x", "mytestdir"])
```

You can specify additional plugins to pytest.main:

```
# content of myinvoke.py
import sys

import pytest

class MyPlugin:
    def pytest_sessionfinish(self):
        print("*** test run reporting finishing")

if __name__ == "__main__":
    sys.exit(pytest.main(["-qq"], plugins=[MyPlugin()]))
```

Running it will show that MyPlugin was added and its hook was invoked:

```
$ python myinvoke.py
*** test run reporting finishing
```

1 Note

Calling pytest.main() will result in importing your tests and any modules that they import. Due to the caching mechanism of python's import system, making subsequent calls to pytest.main() from the same process will not reflect changes to those files between the calls. For this reason, making multiple calls to pytest.main() from the same process (in order to re-run tests, for example) is not recommended.

2.2 How to write and report assertions in tests

2.2.1 Asserting with the assert statement

pytest allows you to use the standard Python assert for verifying expectations and values in Python tests. For example, you can write the following:

```
# content of test_assert1.py
def f():
    return 3
```

```
def test_function():
    assert f() == 4
```

to assert that your function returns a certain value. If this assertion fails you will see the return value of the function call:

```
$ pytest test_assert1.py
----- test session starts ------
platform linux -- Python 3.x.y, pytest-8.x.y, pluggy-1.x.y
rootdir: /home/sweet/project
collected 1 item
test_assert1.py F
                                            [100%]
_____ test_function _
  def test_function():
    assert f() == 4
     assert 3 == 4
Ε
\mathbf{E}
     + where 3 = f()
test_assert1.py:6: AssertionError
FAILED test_assert1.py::test_function - assert 3 == 4
----- 1 failed in 0.12s ------
```

pytest has support for showing the values of the most common subexpressions including calls, attributes, comparisons, and binary and unary operators. (See *Demo of Python failure reports with pytest*). This allows you to use the idiomatic python constructs without boilerplate code while not losing introspection information.

If a message is specified with the assertion like this:

```
assert a % 2 == 0, "value was odd, should be even"
```

it is printed alongside the assertion introspection in the traceback.

See Assertion introspection details for more information on assertion introspection.

2.2.2 Assertions about expected exceptions

In order to write assertions about raised exceptions, you can use pytest.raises() as a context manager like this:

```
def test_zero_division():
    with pytest.raises(ZeroDivisionError):
        1 / 0
```

and if you need to have access to the actual exception info you may use:

```
def test_recursion_depth():
    with pytest.raises(RuntimeError) as excinfo:
    def f():
        f()
        (continues on next page)
```

```
f()
assert "maximum recursion" in str(excinfo.value)
```

excinfo is an *ExceptionInfo* instance, which is a wrapper around the actual exception raised. The main attributes of interest are .type, .value and .traceback.

Note that pytest.raises will match the exception type or any subclasses (like the standard except statement). If you want to check if a block of code is raising an exact exception type, you need to check that explicitly:

```
def test_foo_not_implemented():
    def foo():
        raise NotImplementedError

with pytest.raises(RuntimeError) as excinfo:
        foo()
    assert excinfo.type is RuntimeError
```

The pytest.raises() call will succeed, even though the function raises NotImplementedError, because NotImplementedError is a subclass of RuntimeError; however the following assert statement will catch the problem.

Matching exception messages

You can pass a match keyword parameter to the context-manager to test that a regular expression matches on the string representation of an exception (similar to the TestCase.assertRaisesRegex method from unittest):

```
def myfunc():
    raise ValueError("Exception 123 raised")

def test_match():
    with pytest.raises(ValueError, match=r".* 123 .*"):
        myfunc()
```

Notes:

- The match parameter is matched with the re.search() function, so in the above example match='123' would have worked as well.
- The match parameter also matches against PEP-678 __notes__.

Matching exception groups

You can also use the <code>excinfo.group_contains()</code> method to test for exceptions returned as part of an <code>ExceptionGroup</code>:

The optional match keyword parameter works the same way as for pytest.raises().

By default group_contains () will recursively search for a matching exception at any level of nested Exception—Group instances. You can specify a depth keyword parameter if you only want to match an exception at a specific level; exceptions contained directly in the top ExceptionGroup would match depth=1.

Alternate form (legacy)

There is an alternate form where you pass a function that will be executed, along *args and **kwargs, and pytest. raises() will execute the function with the arguments and assert that the given exception is raised:

```
def func(x):
    if x <= 0:
        raise ValueError("x needs to be larger than zero")

pytest.raises(ValueError, func, x=-1)</pre>
```

The reporter will provide you with helpful output in case of failures such as no exception or wrong exception.

This form was the original pytest.raises() API, developed before the with statement was added to the Python language. Nowadays, this form is rarely used, with the context-manager form (using with) being considered more

readable. Nonetheless, this form is fully supported and not deprecated in any way.

xfail mark and pytest.raises

It is also possible to specify a raises argument to *pytest.mark.xfail*, which checks that the test is failing in a more specific way than just having any exception raised:

```
def f():
    raise IndexError()

@pytest.mark.xfail(raises=IndexError)
def test_f():
    f()
```

This will only "xfail" if the test fails by raising IndexError or subclasses.

- Using *pytest.mark.xfail* with the raises parameter is probably better for something like documenting unfixed bugs (where the test describes what "should" happen) or bugs in dependencies.
- Using pytest.raises() is likely to be better for cases where you are testing exceptions your own code is deliberately raising, which is the majority of cases.

2.2.3 Assertions about expected warnings

You can check that code raises a particular warning using *pytest.warns*.

2.2.4 Making use of context-sensitive comparisons

pytest has rich support for providing context-sensitive information when it encounters comparisons. For example:

```
# content of test_assert2.py
def test_set_comparison():
    set1 = set("1308")
    set2 = set("8035")
    assert set1 == set2
```

if you run this module:

Special comparisons are done for a number of cases:

- comparing long strings: a context diff is shown
- · comparing long sequences: first failing indices
- · comparing dicts: different entries

See the reporting demo for many more examples.

2.2.5 Defining your own explanation for failed assertions

It is possible to add your own detailed explanations by implementing the pytest_assertrepr_compare hook.

```
pytest_assertrepr_compare (config, op, left, right)
```

Return explanation for comparisons in failing assert expressions.

Return None for no custom explanation, otherwise return a list of strings. The strings will be joined by newlines but any newlines *in* a string will be escaped. Note that all but the first line will be indented slightly, the intention is for the first line to be a summary.

Parameters

- config (Config) The pytest config object.
- op (str) The operator, e.g. "==", "!=", "not in".
- **left** (object) The left operand.
- right (object) The right operand.

Use in conftest plugins

Any conftest file can implement this hook. For a given item, only conftest files in the item's directory and its parent directories are consulted.

As an example consider adding the following hook in a *conftest.py* file which provides an alternative explanation for Foo objects:

```
# content of conftest.py
from test_foocompare import Foo

def pytest_assertrepr_compare(op, left, right):
    if isinstance(left, Foo) and isinstance(right, Foo) and op == "==":
```

```
return [
    "Comparing Foo instances:",
    f" vals: {left.val} != {right.val}",
]
```

now, given this test module:

```
# content of test_foocompare.py
class Foo:
    def __init__(self, val):
        self.val = val

    def __eq__(self, other):
        return self.val == other.val

def test_compare():
    f1 = Foo(1)
    f2 = Foo(2)
    assert f1 == f2
```

you can run the test module and get the custom output defined in the conftest file:

2.2.6 Assertion introspection details

Reporting details about a failing assertion is achieved by rewriting assert statements before they are run. Rewritten assert statements put introspection information into the assertion failure message. pytest only rewrites test modules directly discovered by its test collection process, so asserts in supporting modules which are not themselves test modules will not be rewritten.

You can manually enable assertion rewriting for an imported module by calling *register_assert_rewrite* before you import it (a good place to do that is in your root conftest.py).

For further information, Benjamin Peterson wrote up Behind the scenes of pytest's new assertion rewriting.

Assertion rewriting caches files on disk

pytest will write back the rewritten modules to disk for caching. You can disable this behavior (for example to avoid leaving stale .pyc files around in projects that move files around a lot) by adding this to the top of your conftest.py file:

```
import sys
sys.dont_write_bytecode = True
```

Note that you still get the benefits of assertion introspection, the only change is that the .pyc files won't be cached on disk

Additionally, rewriting will silently skip caching if it cannot write new .pyc files, i.e. in a read-only filesystem or a zipfile.

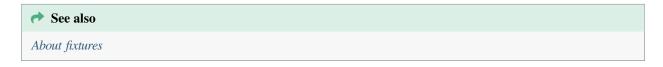
Disabling assert rewriting

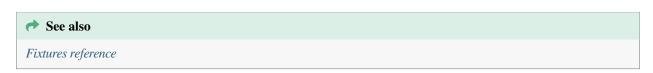
pytest rewrites test modules on import by using an import hook to write new pyc files. Most of the time this works transparently. However, if you are working with the import machinery yourself, the import hook may interfere.

If this is the case you have two options:

- Disable rewriting for a specific module by adding the string PYTEST_DONT_REWRITE to its docstring.
- Disable rewriting for all modules by using --assert=plain.

2.3 How to use fixtures





2.3.1 "Requesting" fixtures

At a basic level, test functions request fixtures they require by declaring them as arguments.

When pytest goes to run a test, it looks at the parameters in that test function's signature, and then searches for fixtures that have the same names as those parameters. Once pytest finds them, it runs those fixtures, captures what they returned (if anything), and passes those objects into the test function as arguments.

Quick example

```
import pytest
class Fruit:
   def __init__(self, name):
       self.name = name
        self.cubed = False
    def cube(self):
        self.cubed = True
class FruitSalad:
    def __init__(self, *fruit_bowl):
        self.fruit = fruit_bowl
       self._cube_fruit()
    def _cube_fruit(self):
        for fruit in self.fruit:
           fruit.cube()
# Arrange
@pytest.fixture
def fruit_bowl():
    return [Fruit("apple"), Fruit("banana")]
def test_fruit_salad(fruit_bowl):
    # Act
   fruit_salad = FruitSalad(*fruit_bowl)
    assert all(fruit.cubed for fruit in fruit_salad.fruit)
```

In this example, test_fruit_salad "requests" fruit_bowl (i.e. def test_fruit_salad(fruit_bowl):), and when pytest sees this, it will execute the fruit_bowl fixture function and pass the object it returns into test_fruit_salad as the fruit_bowl argument.

Here's roughly what's happening if we were to do it by hand:

```
def fruit_bowl():
    return [Fruit("apple"), Fruit("banana")]

def test_fruit_salad(fruit_bowl):
    # Act
    fruit_salad = FruitSalad(*fruit_bowl)

# Assert
    assert all(fruit.cubed for fruit in fruit_salad.fruit)

# Arrange
bowl = fruit_bowl()
test_fruit_salad(fruit_bowl=bowl)
```

Fixtures can request other fixtures

One of pytest's greatest strengths is its extremely flexible fixture system. It allows us to boil down complex requirements for tests into more simple and organized functions, where we only need to have each one describe the things they are dependent on. We'll get more into this further down, but for now, here's a quick example to demonstrate how fixtures can use other fixtures:

```
# contents of test_append.py
import pytest

# Arrange
@pytest.fixture
def first_entry():
    return "a"

# Arrange
@pytest.fixture
def order(first_entry):
    return [first_entry]

def test_string(order):
    # Act
    order.append("b")

# Assert
    assert order == ["a", "b"]
```

Notice that this is the same example from above, but very little changed. The fixtures in pytest **request** fixtures just like tests. All the same **requesting** rules apply to fixtures that do for tests. Here's how this example would work if we did it by hand:

```
def first_entry():
    return "a"

def order(first_entry):
    return [first_entry]

def test_string(order):
    # Act
    order.append("b")

# Assert
    assert order == ["a", "b"]

entry = first_entry()
the_list = order(first_entry=entry)
test_string(order=the_list)
```

Fixtures are reusable

One of the things that makes pytest's fixture system so powerful, is that it gives us the ability to define a generic setup step that can be reused over and over, just like a normal function would be used. Two different tests can request the same fixture and have pytest give each test their own result from that fixture.

This is extremely useful for making sure tests aren't affected by each other. We can use this system to make sure each test gets its own fresh batch of data and is starting from a clean state so it can provide consistent, repeatable results.

Here's an example of how this can come in handy:

```
# contents of test_append.py
import pytest
# Arrange
@pytest.fixture
def first_entry():
   return "a"
# Arrange
@pytest.fixture
def order(first_entry):
   return [first_entry]
def test_string(order):
   # Act
   order.append("b")
    # Assert
    assert order == ["a", "b"]
def test_int(order):
   # Act
   order.append(2)
    # Assert
    assert order == ["a", 2]
```

Each test here is being given its own copy of that list object, which means the order fixture is getting executed twice (the same is true for the first_entry fixture). If we were to do this by hand as well, it would look something like this:

```
def first_entry():
    return "a"

def order(first_entry):
    return [first_entry]

def test_string(order):
    # Act
    order.append("b")
```

```
# Assert
assert order == ["a", "b"]

def test_int(order):
    # Act
    order.append(2)

# Assert
assert order == ["a", 2]

entry = first_entry()
the_list = order(first_entry=entry)
test_string(order=the_list)

entry = first_entry()
the_list = order(first_entry=entry)
test_int(order=the_list)
```

A test/fixture can request more than one fixture at a time

Tests and fixtures aren't limited to **requesting** a single fixture at a time. They can request as many as they like. Here's another quick example to demonstrate:

```
# contents of test_append.py
import pytest
# Arrange
@pytest.fixture
def first_entry():
   return "a"
# Arrange
@pytest.fixture
def second_entry():
   return 2
# Arrange
@pytest.fixture
def order(first_entry, second_entry):
   return [first_entry, second_entry]
# Arrange
@pytest.fixture
def expected_list():
    return ["a", 2, 3.0]
def test_string(order, expected_list):
    # Act
```

```
order.append(3.0)

# Assert
assert order == expected_list
```

Fixtures can be requested more than once per test (return values are cached)

Fixtures can also be **requested** more than once during the same test, and pytest won't execute them again for that test. This means we can **request** fixtures in multiple fixtures that are dependent on them (and even again in the test itself) without those fixtures being executed more than once.

```
# contents of test_append.py
import pytest
# Arrange
@pytest.fixture
def first_entry():
   return "a"
# Arrange
@pytest.fixture
def order():
    return []
# Act
@pytest.fixture
def append_first(order, first_entry):
    return order.append(first_entry)
def test_string_only(append_first, order, first_entry):
    # Assert
    assert order == [first_entry]
```

If a **requested** fixture was executed once for every time it was **requested** during a test, then this test would fail because both append_first and test_string_only would see order as an empty list (i.e. []), but since the return value of order was cached (along with any side effects executing it may have had) after the first time it was called, both the test and append_first were referencing the same object, and the test saw the effect append_first had on that object.

2.3.2 Autouse fixtures (fixtures you don't have to request)

Sometimes you may want to have a fixture (or even several) that you know all your tests will depend on. "Autouse" fixtures are a convenient way to make all tests automatically **request** them. This can cut out a lot of redundant **requests**, and can even provide more advanced fixture usage (more on that further down).

We can make a fixture an autouse fixture by passing in autouse=True to the fixture's decorator. Here's a simple example for how they can be used:

```
# contents of test_append.py
import pytest
@pytest.fixture
def first_entry():
   return "a"
@pytest.fixture
def order(first_entry):
    return []
@pytest.fixture(autouse=True)
def append_first(order, first_entry):
    return order.append(first_entry)
def test_string_only(order, first_entry):
   assert order == [first_entry]
def test_string_and_int(order, first_entry):
   order.append(2)
    assert order == [first_entry, 2]
```

In this example, the append_first fixture is an autouse fixture. Because it happens automatically, both tests are affected by it, even though neither test **requested** it. That doesn't mean they *can't* be **requested** though; just that it isn't *necessary*.

2.3.3 Scope: sharing fixtures across classes, modules, packages or session

Fixtures requiring network access depend on connectivity and are usually time-expensive to create. Extending the previous example, we can add a <code>scope="module"</code> parameter to the <code>@pytest.fixture</code> invocation to cause a <code>smtp_connection</code> fixture function, responsible to create a connection to a preexisting SMTP server, to only be invoked once per test *module* (the default is to invoke once per test *function*). Multiple test functions in a test module will thus each receive the same <code>smtp_connection</code> fixture instance, thus saving time. Possible values for <code>scope</code> are: <code>function</code>, <code>class</code>, <code>module</code>, <code>package</code> or <code>session</code>.

The next example puts the fixture function into a separate conftest.py file so that tests from multiple test modules in the directory can access the fixture function:

```
# content of conftest.py
import smtplib

import pytest

@pytest.fixture(scope="module")
def smtp_connection():
    return smtplib.SMTP("smtp.gmail.com", 587, timeout=5)
```

```
# content of test_module.py (continues on next page)
```

```
def test_ehlo(smtp_connection):
    response, msg = smtp_connection.ehlo()
    assert response == 250
    assert b"smtp.gmail.com" in msg
    assert 0 # for demo purposes

def test_noop(smtp_connection):
    response, msg = smtp_connection.noop()
    assert response == 250
    assert 0 # for demo purposes
```

Here, the test_ehlo needs the smtp_connection fixture value. pytest will discover and call the @pytest. fixture marked smtp_connection fixture function. Running the test looks like this:

```
$ pytest test_module.py
----- test session starts ------
platform linux -- Python 3.x.y, pytest-8.x.y, pluggy-1.x.y
rootdir: /home/sweet/project
collected 2 items
                                                        [100%]
test_module.py FF
_ test_ehlo .
smtp_connection = <smtplib.SMTP object at 0xdeadbeef0001>
   def test_ehlo(smtp_connection):
      response, msg = smtp_connection.ehlo()
      assert response == 250
      assert b"smtp.gmail.com" in msg
      assert 0 # for demo purposes
E
      assert 0
test_module.py:7: AssertionError
                   _____ test_noop _
smtp_connection = <smtplib.SMTP object at 0xdeadbeef0001>
   def test_noop(smtp_connection):
      response, msg = smtp_connection.noop()
      assert response == 250
      assert 0 # for demo purposes
      assert 0
test_module.py:13: AssertionError
======= short test summary info =============================
FAILED test_module.py::test_ehlo - assert 0
FAILED test_module.py::test_noop - assert 0
```

You see the two assert 0 failing and more importantly you can also see that the **exactly same** smtp_connection object was passed into the two test functions because pytest shows the incoming argument values in the traceback. As a result, the two test functions using smtp_connection run as quick as a single one because they reuse the same instance.

If you decide that you rather want to have a session-scoped smtp_connection instance, you can simply declare it:

```
@pytest.fixture(scope="session")
def smtp_connection():
    # the returned fixture value will be shared for
    # all tests requesting it
    ...
```

Fixture scopes

Fixtures are created when first requested by a test, and are destroyed based on their scope:

- function: the default scope, the fixture is destroyed at the end of the test.
- class: the fixture is destroyed during teardown of the last test in the class.
- module: the fixture is destroyed during teardown of the last test in the module.
- package: the fixture is destroyed during teardown of the last test in the package where the fixture is defined, including sub-packages and sub-directories within it.
- session: the fixture is destroyed at the end of the test session.



Pytest only caches one instance of a fixture at a time, which means that when using a parametrized fixture, pytest may invoke a fixture more than once in the given scope.

Dynamic scope

Added in version 5.2.

In some cases, you might want to change the scope of the fixture without changing the code. To do that, pass a callable to scope. The callable must return a string with a valid scope and will be executed only once - during the fixture definition. It will be called with two keyword arguments - fixture_name as a string and config with a configuration object.

This can be especially useful when dealing with fixtures that need time for setup, like spawning a docker container. You can use the command-line argument to control the scope of the spawned containers for different environments. See the example below.

```
def determine_scope(fixture_name, config):
    if config.getoption("--keep-containers", None):
        return "session"
    return "function"

@pytest.fixture(scope=determine_scope)
def docker_container():
    yield spawn_container()
```

2.3.4 Teardown/Cleanup (AKA Fixture finalization)

When we run our tests, we'll want to make sure they clean up after themselves so they don't mess with any other tests (and also so that we don't leave behind a mountain of test data to bloat the system). Fixtures in pytest offer a very useful teardown system, which allows us to define the specific steps necessary for each fixture to clean up after itself.

This system can be leveraged in two ways.

1. yield fixtures (recommended)

"Yield" fixtures yield instead of return. With these fixtures, we can run some code and pass an object back to the requesting fixture/test, just like with the other fixtures. The only differences are:

- 1. return is swapped out for yield.
- 2. Any teardown code for that fixture is placed after the yield.

Once pytest figures out a linear order for the fixtures, it will run each one up until it returns or yields, and then move on to the next fixture in the list to do the same thing.

Once the test is finished, pytest will go back down the list of fixtures, but in the *reverse order*, taking each one that yielded, and running the code inside it that was *after* the yield statement.

As a simple example, consider this basic email module:

```
# content of emaillib.py
class MailAdminClient:
   def create user(self):
       return MailUser()
    def delete_user(self, user):
        # do some cleanup
        pass
class MailUser:
    def __init__(self):
        self.inbox = []
    def send_email(self, email, other):
        other.inbox.append(email)
    def clear_mailbox(self):
        self.inbox.clear()
class Email:
    def __init__(self, subject, body):
        self.subject = subject
        self.body = body
```

Let's say we want to test sending email from one user to another. We'll have to first make each user, then send the email from one user to the other, and finally assert that the other user received that message in their inbox. If we want to clean up after the test runs, we'll likely have to make sure the other user's mailbox is emptied before deleting that user, otherwise the system may complain.

Here's what that might look like:

```
# content of test_emaillib.py
from emaillib import Email, MailAdminClient
import pytest
@pytest.fixture
def mail_admin():
   return MailAdminClient()
@pytest.fixture
def sending_user(mail_admin):
   user = mail_admin.create_user()
   yield user
   mail_admin.delete_user(user)
@pytest.fixture
def receiving_user(mail_admin):
   user = mail_admin.create_user()
   yield user
   user.clear_mailbox()
   mail_admin.delete_user(user)
def test_email_received(sending_user, receiving_user):
   email = Email(subject="Hey!", body="How's it going?")
    sending_user.send_email(email, receiving_user)
   assert email in receiving_user.inbox
```

Because receiving_user is the last fixture to run during setup, it's the first to run during teardown.

There is a risk that even having the order right on the teardown side of things doesn't guarantee a safe cleanup. That's covered in a bit more detail in *Safe teardowns*.

```
$ pytest -q test_emaillib.py
.
[100%]
1 passed in 0.12s
```

Handling errors for yield fixture

If a yield fixture raises an exception before yielding, pytest won't try to run the teardown code after that yield fixture's yield statement. But, for every fixture that has already run successfully for that test, pytest will still attempt to tear them down as it normally would.

2. Adding finalizers directly

While yield fixtures are considered to be the cleaner and more straightforward option, there is another choice, and that is to add "finalizer" functions directly to the test's *request-context* object. It brings a similar result as yield fixtures, but requires a bit more verbosity.

In order to use this approach, we have to request the *request-context* object (just like we would request another fixture) in the fixture we need to add teardown code for, and then pass a callable, containing that teardown code, to its addfinalizer method.

We have to be careful though, because pytest will run that finalizer once it's been added, even if that fixture raises an exception after adding the finalizer. So to make sure we don't run the finalizer code when we wouldn't need to, we would only add the finalizer once the fixture would have done something that we'd need to teardown.

Here's how the previous example would look using the addfinalizer method:

```
# content of test_emaillib.py
from emaillib import Email, MailAdminClient
import pytest
@pytest.fixture
def mail_admin():
    return MailAdminClient()
@pytest.fixture
def sending_user(mail_admin):
   user = mail_admin.create_user()
   yield user
   mail_admin.delete_user(user)
@pytest.fixture
def receiving_user(mail_admin, request):
    user = mail_admin.create_user()
    def delete_user():
        mail_admin.delete_user(user)
   request.addfinalizer(delete_user)
    return user
@pytest.fixture
def email(sending_user, receiving_user, request):
    _email = Email(subject="Hey!", body="How's it going?")
    sending_user.send_email(_email, receiving_user)
    def empty_mailbox():
        receiving_user.clear_mailbox()
   request.addfinalizer(empty_mailbox)
    return _email
def test_email_received(receiving_user, email):
   assert email in receiving_user.inbox
```

It's a bit longer than yield fixtures and a bit more complex, but it does offer some nuances for when you're in a pinch.

```
$ pytest -q test_emaillib.py
.
[100%]
1 passed in 0.12s
```

Note on finalizer order

Finalizers are executed in a first-in-last-out order. For yield fixtures, the first teardown code to run is from the right-most fixture, i.e. the last test parameter.

```
# content of test_finalizers.py
import pytest

def test_bar(fix_w_yield1, fix_w_yield2):
    print("test_bar")

@pytest.fixture
def fix_w_yield1():
    yield
    print("after_yield_1")

@pytest.fixture
def fix_w_yield2():
    yield
    print("after_yield_2")
```

For finalizers, the first fixture to run is last call to request.addfinalizer.

```
# content of test_finalizers.py
from functools import partial
import pytest

@pytest.fixture
def fix_w_finalizers(request):
    request.addfinalizer(partial(print, "finalizer_2"))
    request.addfinalizer(partial(print, "finalizer_1"))
```

```
def test_bar(fix_w_finalizers):
    print("test_bar")
```

This is so because yield fixtures use addfinalizer behind the scenes: when the fixture executes, addfinalizer registers a function that resumes the generator, which in turn calls the teardown code.

2.3.5 Safe teardowns

The fixture system of pytest is *very* powerful, but it's still being run by a computer, so it isn't able to figure out how to safely teardown everything we throw at it. If we aren't careful, an error in the wrong spot might leave stuff from our tests behind, and that can cause further issues pretty quickly.

For example, consider the following tests (based off of the mail example from above):

```
# content of test_emaillib.py
from emaillib import Email, MailAdminClient
import pytest
@pytest.fixture
def setup():
   mail_admin = MailAdminClient()
    sending_user = mail_admin.create_user()
   receiving_user = mail_admin.create_user()
   email = Email(subject="Hey!", body="How's it going?")
   sending_user.send_email(email, receiving_user)
   yield receiving_user, email
   receiving_user.clear_mailbox()
   mail_admin.delete_user(sending_user)
   mail_admin.delete_user(receiving_user)
def test_email_received(setup):
    receiving_user, email = setup
    assert email in receiving_user.inbox
```

This version is a lot more compact, but it's also harder to read, doesn't have a very descriptive fixture name, and none of the fixtures can be reused easily.

There's also a more serious issue, which is that if any of those steps in the setup raise an exception, none of the teardown code will run.

One option might be to go with the addfinalizer method instead of yield fixtures, but that might get pretty complex and difficult to maintain (and it wouldn't be compact anymore).

```
$ pytest -q test_emaillib.py
.
[100%]
1 passed in 0.12s
```

Safe fixture structure

The safest and simplest fixture structure requires limiting fixtures to only making one state-changing action each, and then bundling them together with their teardown code, as *the email examples above* showed.

The chance that a state-changing operation can fail but still modify state is negligible, as most of these operations tend to be transaction-based (at least at the level of testing where state could be left behind). So if we make sure that any successful state-changing action gets torn down by moving it to a separate fixture function and separating it from other, potentially failing state-changing actions, then our tests will stand the best chance at leaving the test environment the way they found it.

For an example, let's say we have a website with a login page, and we have access to an admin API where we can generate users. For our test, we want to:

- 1. Create a user through that admin API
- 2. Launch a browser using Selenium
- 3. Go to the login page of our site
- 4. Log in as the user we created
- 5. Assert that their name is in the header of the landing page

We wouldn't want to leave that user in the system, nor would we want to leave that browser session running, so we'll want to make sure the fixtures that create those things clean up after themselves.

Here's what that might look like:

1 Note

For this example, certain fixtures (i.e. base_url and admin_credentials) are implied to exist elsewhere. So for now, let's assume they exist, and we're just not looking at them.

```
from uuid import uuid4
from urllib.parse import urljoin

from selenium.webdriver import Chrome
import pytest

from src.utils.pages import LoginPage, LandingPage
from src.utils import AdminApiClient
from src.utils.data_types import User

@pytest.fixture
def admin_client(base_url, admin_credentials):
    return AdminApiClient(base_url, **admin_credentials)
```

```
@pytest.fixture
def user(admin_client):
    _user = User(name="Susan", username=f"testuser-{uuid4()}", password="P4$$word")
   admin_client.create_user(_user)
    yield _user
    admin_client.delete_user(_user)
@pytest.fixture
def driver():
   _driver = Chrome()
   yield _driver
    _driver.quit()
@pvtest.fixture
def login(driver, base_url, user):
    driver.get(urljoin(base_url, "/login"))
    page = LoginPage(driver)
    page.login(user)
@pytest.fixture
def landing_page(driver, login):
    return LandingPage (driver)
def test_name_on_landing_page_after_login(landing_page, user):
    assert landing_page.header == f"Welcome, {user.name}!"
```

The way the dependencies are laid out means it's unclear if the user fixture would execute before the driver fixture. But that's ok, because those are atomic operations, and so it doesn't matter which one runs first because the sequence of events for the test is still linearizable. But what *does* matter is that, no matter which one runs first, if the one raises an exception while the other would not have, neither will have left anything behind. If driver executes before user, and user raises an exception, the driver will still quit, and the user was never made. And if driver was the one to raise the exception, then the driver would never have been started and the user would never have been made.

2.3.6 Running multiple assert statements safely

Sometimes you may want to run multiple asserts after doing all that setup, which makes sense as, in more complex systems, a single action can kick off multiple behaviors. pytest has a convenient way of handling this and it combines a bunch of what we've gone over so far.

All that's needed is stepping up to a larger scope, then having the **act** step defined as an autouse fixture, and finally, making sure all the fixtures are targeting that higher level scope.

Let's pull *an example from above*, and tweak it a bit. Let's say that in addition to checking for a welcome message in the header, we also want to check for a sign out button, and a link to the user's profile.

Let's take a look at how we can structure that so we can run multiple asserts without having to repeat all those steps again.



For this example, certain fixtures (i.e. base_url and admin_credentials) are implied to exist elsewhere. So for now, let's assume they exist, and we're just not looking at them.

```
# contents of tests/end_to_end/test_login.py
from uuid import uuid4
from urllib.parse import urljoin
from selenium.webdriver import Chrome
import pytest
from src.utils.pages import LoginPage, LandingPage
from src.utils import AdminApiClient
from src.utils.data_types import User
@pytest.fixture(scope="class")
def admin_client(base_url, admin_credentials):
    return AdminApiClient(base_url, **admin_credentials)
@pytest.fixture(scope="class")
def user(admin_client):
   _user = User(name="Susan", username=f"testuser-{uuid4()}", password="P4$$word")
   admin_client.create_user(_user)
   yield _user
   admin_client.delete_user(_user)
@pytest.fixture(scope="class")
def driver():
    _driver = Chrome()
   yield _driver
    _driver.quit()
@pytest.fixture(scope="class")
def landing_page(driver, login):
   return LandingPage(driver)
class TestLandingPageSuccess:
    @pytest.fixture(scope="class", autouse=True)
    def login(self, driver, base_url, user):
        driver.get(urljoin(base_url, "/login"))
        page = LoginPage(driver)
       page.login(user)
   def test_name_in_header(self, landing_page, user):
        assert landing_page.header == f"Welcome, {user.name}!"
   def test_sign_out_button(self, landing_page):
        assert landing_page.sign_out_button.is_displayed()
    def test_profile_link(self, landing_page, user):
        profile_href = urljoin(base_url, f"/profile?id={user.profile_id}")
        assert landing_page.profile_link.get_attribute("href") == profile_href
```

Notice that the methods are only referencing self in the signature as a formality. No state is tied to the actual test class as it might be in the unittest. TestCase framework. Everything is managed by the pytest fixture system.

Each method only has to request the fixtures that it actually needs without worrying about order. This is because the act

fixture is an autouse fixture, and it made sure all the other fixtures executed before it. There's no more changes of state that need to take place, so the tests are free to make as many non-state-changing queries as they want without risking stepping on the toes of the other tests.

The login fixture is defined inside the class as well, because not every one of the other tests in the module will be expecting a successful login, and the **act** may need to be handled a little differently for another test class. For example, if we wanted to write another test scenario around submitting bad credentials, we could handle it by adding something like this to the test file:

```
class TestLandingPageBadCredentials:
    @pytest.fixture(scope="class")
    def faux_user(self, user):
        _user = deepcopy(user)
        _user.password = "badpass"
        return _user

def test_raises_bad_credentials_exception(self, login_page, faux_user):
        with pytest.raises(BadCredentialsException):
        login_page.login(faux_user)
```

2.3.7 Fixtures can introspect the requesting test context

Fixture functions can accept the request object to introspect the "requesting" test function, class or module context. Further extending the previous smtp_connection fixture example, let's read an optional server URL from the test module which uses our fixture:

```
# content of conftest.py
import smtplib

import pytest

@pytest.fixture(scope="module")
def smtp_connection(request):
    server = getattr(request.module, "smtpserver", "smtp.gmail.com")
    smtp_connection = smtplib.SMTP(server, 587, timeout=5)
    yield smtp_connection
    print(f"finalizing {smtp_connection} ({server})")
    smtp_connection.close()
```

We use the request.module attribute to optionally obtain an smtpserver attribute from the test module. If we just execute again, nothing much has changed:

Let's quickly create another test module that actually sets the server URL in its module namespace:

```
# content of test_anothersmtp.py
smtpserver = "mail.python.org" # will be read by smtp fixture

(continues on next page)
```

```
def test_showhelo(smtp_connection):
   assert 0, smtp_connection.helo()
```

Running it:

voila! The smtp_connection fixture function picked up our mail server name from the module namespace.

2.3.8 Using markers to pass data to fixtures

Using the request object, a fixture can also access markers which are applied to a test function. This can be useful to pass data into a fixture from a test:

```
import pytest

@pytest.fixture
def fixt(request):
    marker = request.node.get_closest_marker("fixt_data")
    if marker is None:
        # Handle missing marker in some way...
        data = None
    else:
        data = marker.args[0]

# Do something with the data
    return data

@pytest.mark.fixt_data(42)
def test_fixt(fixt):
    assert fixt == 42
```

2.3.9 Factories as fixtures

The "factory as fixture" pattern can help in situations where the result of a fixture is needed multiple times in a single test. Instead of returning data directly, the fixture instead returns a function which generates the data. This function can then be called multiple times in the test.

Factories can have parameters as needed:

```
@pytest.fixture
def make_customer_record():
    def _make_customer_record(name):
        return {"name": name, "orders": []}

    return _make_customer_record

def test_customer_records(make_customer_record):
    customer_1 = make_customer_record("Lisa")
    customer_2 = make_customer_record("Mike")
    customer_3 = make_customer_record("Meredith")
```

If the data created by the factory requires managing, the fixture can take care of that:

```
@pytest.fixture
def make_customer_record():
    created_records = []

def _make_customer_record(name):
        record = models.Customer(name=name, orders=[])
        created_records.append(record)
        return record

    yield _make_customer_record

    for record in created_records:
        record.destroy()

def test_customer_records(make_customer_record):
        customer_1 = make_customer_record("Lisa")
        customer_2 = make_customer_record("Mike")
        customer_3 = make_customer_record("Meredith")
```

2.3.10 Parametrizing fixtures

Fixture functions can be parametrized in which case they will be called multiple times, each time executing the set of dependent tests, i.e. the tests that depend on this fixture. Test functions usually do not need to be aware of their re-running. Fixture parametrization helps to write exhaustive functional tests for components which themselves can be configured in multiple ways.

Extending the previous example, we can flag the fixture to create two smtp_connection fixture instances which will cause all tests using the fixture to run twice. The fixture function gets access to each parameter through the special request object:

```
# content of conftest.py
import smtplib
(continues on next page)
```

```
import pytest

@pytest.fixture(scope="module", params=["smtp.gmail.com", "mail.python.org"])
def smtp_connection(request):
    smtp_connection = smtplib.SMTP(request.param, 587, timeout=5)
    yield smtp_connection
    print(f"finalizing {smtp_connection}")
    smtp_connection.close()
```

The main change is the declaration of params with <code>@pytest.fixture</code>, a list of values for each of which the fixture function will execute and can access a value via <code>request.param</code>. No test function code needs to change. So let's just do another run:

```
$ pytest -q test_module.py
                                                              [100%]
_____ test_ehlo[smtp.gmail.com] _
smtp_connection = <smtplib.SMTP object at 0xdeadbeef0004>
   def test_ehlo(smtp_connection):
       response, msg = smtp_connection.ehlo()
       assert response == 250
       assert b"smtp.gmail.com" in msg
       assert 0 # for demo purposes
       assert 0
test_module.py:7: AssertionError
      _____ test_noop[smtp.gmail.com] __
smtp_connection = <smtplib.SMTP object at 0xdeadbeef0004>
   def test_noop(smtp_connection):
       response, msg = smtp_connection.noop()
       assert response == 250
       assert 0 # for demo purposes
Ε
       assert 0
test_module.py:13: AssertionError
             _____ test_ehlo[mail.python.org] _
smtp_connection = <smtplib.SMTP object at 0xdeadbeef0005>
   def test_ehlo(smtp_connection):
      response, msg = smtp_connection.ehlo()
       assert response == 250
       assert b"smtp.gmail.com" in msg
      AssertionError: assert b'smtp.gmail.com' in b'mail.python.org\nPIPELINING\
→nSIZE 51200000\nETRN\nSTARTTLS\nAUTH DIGEST-MD5 NTLM CRAM-MD5\nENHANCEDSTATUSCODES\
→n8BITMIME\nDSN\nSMTPUTF8\nCHUNKING'
test_module.py:6: AssertionError
    ----- Captured stdout setup
finalizing <smtplib.SMTP object at 0xdeadbeef0004>
```

```
_ test_noop[mail.python.org] _
smtp_connection = <smtplib.SMTP object at 0xdeadbeef0005>
   def test_noop(smtp_connection):
       response, msg = smtp_connection.noop()
       assert response == 250
       assert 0 # for demo purposes
Ε
       assert 0
test_module.py:13: AssertionError
    ------
finalizing <smtplib.SMTP object at 0xdeadbeef0005>
============ short test summary info ========================
FAILED test_module.py::test_ehlo[smtp.qmail.com] - assert 0
FAILED test_module.py::test_noop[smtp.gmail.com] - assert 0
FAILED test_module.py::test_ehlo[mail.python.org] - AssertionError: asser...
FAILED test_module.py::test_noop[mail.python.org] - assert 0
4 failed in 0.12s
```

We see that our two test functions each ran twice, against the different smtp_connection instances. Note also, that with the mail.python.org connection the second test fails in test_ehlo because a different server string is expected than what arrived.

pytest will build a string that is the test ID for each fixture value in a parametrized fixture, e.g. test_ehlo[smtp.gmail.com] and test_ehlo[mail.python.org] in the above examples. These IDs can be used with -k to select specific cases to run, and they will also identify the specific case when one is failing. Running pytest with --collect-only will show the generated IDs.

Numbers, strings, booleans and None will have their usual string representation used in the test ID. For other objects, pytest will make a string based on the argument name. It is possible to customise the string used in a test ID for a certain fixture value by using the ids keyword argument:

```
# content of test_ids.py
import pytest

@pytest.fixture(params=[0, 1], ids=["spam", "ham"])
def a(request):
    return request.param

def test_a(a):
    pass

def idfn(fixture_value):
    if fixture_value == 0:
        return "eggs"
    else:
        return None

@pytest.fixture(params=[0, 1], ids=idfn)
def b(request):
    return request.param
```

```
def test_b(b):
   pass
```

The above shows how ids can be either a list of strings to use or a function which will be called with the fixture value and then has to return a string to use. In the latter case if the function returns None then pytest's auto-generated ID will be used.

Running the above tests results in the following test IDs being used:

```
$ pytest --collect-only
  platform linux -- Python 3.x.y, pytest-8.x.y, pluggy-1.x.y
rootdir: /home/sweet/project
collected 12 items
<Dir fixtures.rst-223>
 <Module test_anothersmtp.py>
   <Function test_showhelo[smtp.gmail.com]>
   <Function test_showhelo[mail.python.org]>
 <Module test_emaillib.py>
   <Function test_email_received>
 <Module test_finalizers.py>
   <Function test_bar>
 <Module test_ids.py>
   <Function test_a[spam]>
   <Function test_a[ham]>
   <Function test_b[eggs]>
   <Function test_b[1]>
 <Module test_module.py>
   <Function test_ehlo[smtp.qmail.com]>
   <Function test_noop[smtp.gmail.com]>
   <Function test_ehlo[mail.python.org]>
   <Function test_noop[mail.python.org]>
```

2.3.11 Using marks with parametrized fixtures

pytest.param() can be used to apply marks in values sets of parametrized fixtures in the same way that they can be used with @pytest.mark.parametrize.

Example:

```
# content of test_fixture_marks.py
import pytest

@pytest.fixture(params=[0, 1, pytest.param(2, marks=pytest.mark.skip)])
def data_set(request):
    return request.param

def test_data(data_set):
    pass
```

Running this test will *skip* the invocation of data_set with value 2:

2.3.12 Modularity: using fixtures from a fixture function

In addition to using fixtures in test functions, fixture functions can use other fixtures themselves. This contributes to a modular design of your fixtures and allows reuse of framework-specific fixtures across many projects. As a simple example, we can extend the previous example and instantiate an object app where we stick the already defined smtp_connection resource into it:

```
# content of test_appsetup.py
import pytest

class App:
    def __init__(self, smtp_connection):
        self.smtp_connection = smtp_connection

@pytest.fixture(scope="module")
def app(smtp_connection):
    return App(smtp_connection)

def test_smtp_connection_exists(app):
    assert app.smtp_connection
```

Here we declare an app fixture which receives the previously defined smtp_connection fixture and instantiates an App object with it. Let's run it:

Due to the parametrization of smtp_connection, the test will run twice with two different App instances and respective smtp servers. There is no need for the app fixture to be aware of the smtp_connection parametrization because pytest will fully analyse the fixture dependency graph.

Note that the app fixture has a scope of module and uses a module-scoped smtp_connection fixture. The example would still work if smtp_connection was cached on a session scope: it is fine for fixtures to use "broader" scoped fixtures but not the other way round: A session-scoped fixture could not use a module-scoped one in a meaningful way.

2.3.13 Automatic grouping of tests by fixture instances

pytest minimizes the number of active fixtures during test runs. If you have a parametrized fixture, then all the tests using it will first execute with one instance and then finalizers are called before the next fixture instance is created. Among other things, this eases testing of applications which create and use global state.

The following example uses two parametrized fixtures, one of which is scoped on a per-module basis, and all the functions perform print calls to show the setup/teardown flow:

```
# content of test_module.py
import pytest
@pytest.fixture(scope="module", params=["mod1", "mod2"])
def modarg(request):
   param = request.param
   print(" SETUP modarg", param)
   yield param
   print(" TEARDOWN modarg", param)
@pytest.fixture(scope="function", params=[1, 2])
def otherarg(request):
   param = request.param
   print(" SETUP otherarg", param)
   yield param
   print(" TEARDOWN otherarg", param)
def test_0 (otherarg):
   print(" RUN test0 with otherarg", otherarg)
def test_1 (modarg):
   print(" RUN test1 with modarg", modarg)
def test_2 (otherarg, modarg):
   print(f" RUN test2 with otherarg {otherarg} and modarg {modarg}")
```

Let's run the tests in verbose mode and with looking at the print-output:

```
RUN test0 with otherarg 1
PASSED TEARDOWN otherarg 1
RUN test0 with otherarg 2
PASSED TEARDOWN otherarg 2
RUN test1 with modarg mod1
PASSED
RUN test2 with otherarg 1 and modarg mod1
PASSED TEARDOWN otherarg 1
RUN test2 with otherarg 2 and modarg mod1
PASSED TEARDOWN otherarg 2
SETUP modarg mod2
RUN test1 with modarg mod2
PASSED
RUN test2 with otherarg 1 and modarg mod2
PASSED TEARDOWN otherarg 1
RUN test2 with otherarg 2 and modarg mod2
PASSED TEARDOWN otherarg 2
 TEARDOWN modarg mod2
```

You can see that the parametrized module-scoped modarg resource caused an ordering of test execution that lead to the fewest possible "active" resources. The finalizer for the mod1 parametrized resource was executed before the mod2 resource was setup.

In particular notice that test_0 is completely independent and finishes first. Then test_1 is executed with mod1, then test_2 with mod1, then test_1 with mod2 and finally test_2 with mod2.

The otherarg parametrized resource (having function scope) was set up before and teared down after every test that used it.

2.3.14 Use fixtures in classes and modules with usefixtures

Sometimes test functions do not directly need access to a fixture object. For example, tests may require to operate with an empty directory as the current working directory but otherwise do not care for the concrete directory. Here is how you can use the standard tempfile and pytest fixtures to achieve it. We separate the creation of the fixture into a conftest.py file:

```
# content of conftest.py (continues on next page)
```

```
import os
import tempfile

import pytest

@pytest.fixture
def cleandir():
    with tempfile.TemporaryDirectory() as newpath:
        old_cwd = os.getcwd()
        os.chdir(newpath)
        yield
        os.chdir(old_cwd)
```

and declare its use in a test module via a usefixtures marker:

```
# content of test_setenv.py
import os

import pytest

@pytest.mark.usefixtures("cleandir")
class TestDirectoryInit:
    def test_cwd_starts_empty(self):
        assert os.listdir(os.getcwd()) == []
        with open("myfile", "w", encoding="utf-8") as f:
        f.write("hello")

    def test_cwd_again_starts_empty(self):
        assert os.listdir(os.getcwd()) == []
```

Due to the usefixtures marker, the cleandir fixture will be required for the execution of each test method, just as if you specified a "cleandir" function argument to each of them. Let's run it to verify our fixture is activated and the tests pass:

```
$ pytest -q
..
2 passed in 0.12s
```

You can specify multiple fixtures like this:

```
@pytest.mark.usefixtures("cleandir", "anotherfixture")
def test(): ...
```

and you may specify fixture usage at the test module level using pytestmark:

```
pytestmark = pytest.mark.usefixtures("cleandir")
```

It is also possible to put fixtures required by all tests in your project into an ini-file:

```
# content of pytest.ini
[pytest]
usefixtures = cleandir
```

A Warning

Note this mark has no effect in fixture functions. For example, this will not work as expected:

```
@pytest.mark.usefixtures("my_other_fixture")
@pytest.fixture
def my_fixture_that_sadly_wont_use_my_other_fixture(): ...
```

This generates a deprecation warning, and will become an error in Pytest 8.

2.3.15 Overriding fixtures on various levels

In relatively large test suite, you most likely need to override a global or root fixture with a locally defined one, keeping the test code readable and maintainable.

Override a fixture on a folder (conftest) level

Given the tests file structure is:

```
tests/
   conftest.py
       # content of tests/conftest.py
       import pytest
       @pytest.fixture
       def username():
           return 'username'
   test_something.py
       # content of tests/test_something.py
       def test_username(username):
           assert username == 'username'
   subfolder/
       conftest.py
            # content of tests/subfolder/conftest.py
            import pytest
            @pytest.fixture
            def username(username):
                return 'overridden-' + username
       test_something_else.py
            # content of tests/subfolder/test_something_else.py
           def test_username(username):
                assert username == 'overridden-username'
```

As you can see, a fixture with the same name can be overridden for certain test folder level. Note that the base or super fixture can be accessed from the overriding fixture easily - used in the example above.

Override a fixture on a test module level

Given the tests file structure is:

```
tests/
   conftest.py
        # content of tests/conftest.py
        import pytest
        @pytest.fixture
        def username():
           return 'username'
   test_something.py
        # content of tests/test_something.py
       import pytest
        @pytest.fixture
        def username(username):
           return 'overridden-' + username
        def test_username(username):
           assert username == 'overridden-username'
    test_something_else.py
        # content of tests/test_something_else.py
        import pytest
        @pytest.fixture
        def username(username):
           return 'overridden-else-' + username
        def test_username(username):
            assert username == 'overridden-else-username'
```

In the example above, a fixture with the same name can be overridden for certain test module.

Override a fixture with direct test parametrization

Given the tests file structure is:

```
tests/
    conftest.py
    # content of tests/conftest.py
    import pytest

    @pytest.fixture
    def username():
        return 'username'

    @pytest.fixture
    def other_username(username):
        return 'other-' + username

test_something.py
    # content of tests/test_something.py
    import pytest
```

```
@pytest.mark.parametrize('username', ['directly-overridden-username'])
def test_username(username):
    assert username == 'directly-overridden-username'

@pytest.mark.parametrize('username', ['directly-overridden-username-other'])
def test_username_other(other_username):
    assert other_username == 'other-directly-overridden-username-other'
```

In the example above, a fixture value is overridden by the test parameter value. Note that the value of the fixture can be overridden this way even if the test doesn't use it directly (doesn't mention it in the function prototype).

Override a parametrized fixture with non-parametrized one and vice versa

Given the tests file structure is:

```
tests/
   conftest.py
        # content of tests/conftest.py
       import pytest
       @pytest.fixture(params=['one', 'two', 'three'])
       def parametrized_username(request):
            return request.param
       @pytest.fixture
       def non_parametrized_username(request):
           return 'username'
   test something.pv
        # content of tests/test_something.py
       import pytest
       @pytest.fixture
       def parametrized_username():
            return 'overridden-username'
       @pytest.fixture(params=['one', 'two', 'three'])
       def non_parametrized_username(request):
           return request.param
       def test_username(parametrized_username):
           assert parametrized_username == 'overridden-username'
       def test_parametrized_username(non_parametrized_username):
           assert non_parametrized_username in ['one', 'two', 'three']
   test_something_else.py
        # content of tests/test_something_else.py
       def test_username(parametrized_username):
            assert parametrized_username in ['one', 'two', 'three']
       def test_username(non_parametrized_username):
            assert non_parametrized_username == 'username'
```

In the example above, a parametrized fixture is overridden with a non-parametrized version, and a non-parametrized

fixture is overridden with a parametrized version for certain test module. The same applies for the test folder level obviously.

2.3.16 Using fixtures from other projects

Usually projects that provide pytest support will use *entry points*, so just installing those projects into an environment will make those fixtures available for use.

In case you want to use fixtures from a project that does not use entry points, you can define pytest_plugins in your top conftest.py file to register that module as a plugin.

Suppose you have some fixtures in mylibrary.fixtures and you want to reuse them into your app/tests directory.

All you need to do is to define pytest_plugins in app/tests/conftest.py pointing to that module.

```
pytest_plugins = "mylibrary.fixtures"
```

This effectively registers mylibrary.fixtures as a plugin, making all its fixtures and hooks available to tests in app/tests.

1 Note

Sometimes users will *import* fixtures from other projects for use, however this is not recommended: importing fixtures into a module will register them in pytest as *defined* in that module.

This has minor consequences, such as appearing multiple times in pytest —help, but it is not **recommended** because this behavior might change/stop working in future versions.

2.4 How to mark test functions with attributes

By using the pytest.mark helper you can easily set metadata on your test functions. You can find the full list of builtin markers in the *API Reference*. Or you can list all the markers, including builtin and custom, using the CLI - pytest --markers.

Here are some of the builtin markers:

- usefixtures use fixtures on a test function or class
- filterwarnings filter certain warnings of a test function
- skip always skip a test function
- skipif skip a test function if a certain condition is met
- xfail produce an "expected failure" outcome if a certain condition is met
- parametrize perform multiple calls to the same test function.

It's easy to create custom markers or to apply markers to whole test classes or modules. Those markers can be used by plugins, and also are commonly used to *select tests* on the command-line with the -m option.

See Working with custom markers for examples which also serve as documentation.



Marks can only be applied to tests, having no effect on fixtures.

2.4.1 Registering marks

You can register custom marks in your pytest.ini file like this:

```
[pytest]
markers =
    slow: marks tests as slow (deselect with '-m "not slow"')
    serial
```

or in your pyproject.toml file like this:

```
[tool.pytest.ini_options]
markers = [
    "slow: marks tests as slow (deselect with '-m \"not slow\"')",
    "serial",
]
```

Note that everything past the: after the mark name is an optional description.

Alternatively, you can register new markers programmatically in a *pytest_configure* hook:

```
def pytest_configure(config):
    config.addinivalue_line(
        "markers", "env(name): mark test to run only on named environment"
    )
```

Registered marks appear in pytest's help text and do not emit warnings (see the next section). It is recommended that third-party plugins always *register their markers*.

2.4.2 Raising errors on unknown marks

Unregistered marks applied with the <code>@pytest.mark.name_of_the_mark</code> decorator will always emit a warning in order to avoid silently doing something surprising due to mistyped names. As described in the previous section, you can disable the warning for custom marks by registering them in your <code>pytest.ini</code> file or using a custom <code>pytest_configure</code> hook.

When the --strict-markers command-line flag is passed, any unknown marks applied with the <code>@pytest.mark.name_of_the_mark</code> decorator will trigger an error. You can enforce this validation in your project by adding --strict-markers to addopts:

```
[pytest]
addopts = --strict-markers
markers =
    slow: marks tests as slow (deselect with '-m "not slow"')
    serial
```

2.5 How to parametrize fixtures and test functions

pytest enables test parametrization at several levels:

- pytest.fixture() allows one to parametrize fixture functions.
- @pytest.mark.parametrize allows one to define multiple sets of arguments and fixtures at the test function or class.
- pytest_generate_tests allows one to define custom parametrization schemes or extensions.

2.5.1 @pytest.mark.parametrize: parametrizing test functions

The builtin *pytest.mark.parametrize* decorator enables parametrization of arguments for a test function. Here is a typical example of a test function that implements checking that a certain input leads to an expected output:

```
# content of test_expectation.py
import pytest

@pytest.mark.parametrize("test_input, expected", [("3+5", 8), ("2+4", 6), ("6*9", 42)])
def test_eval(test_input, expected):
    assert eval(test_input) == expected
```

Here, the @parametrize decorator defines three different (test_input,expected) tuples so that the test_eval function will run three times using them in turn:

```
$ pytest
platform linux -- Python 3.x.y, pytest-8.x.y, pluggy-1.x.y
rootdir: /home/sweet/project
collected 3 items
                                                        [100%]
test_expectation.py ..F
_ test_eval[6*9-42] _
test_input = '6*9', expected = 42
   @pytest.mark.parametrize("test_input,expected", [("3+5", 8), ("2+4", 6), ("6*9", __

→42)])
   def test_eval(test_input, expected):
      assert eval(test_input) == expected
      AssertionError: assert 54 == 42
      + where 54 = eval('6*9')
test_expectation.py:6: AssertionError
========== short test summary info ==========================
FAILED test_expectation.py::test_eval[6*9-42] - AssertionError: assert 54...
=================== 1 failed, 2 passed in 0.12s ==========================
```

Note

Parameter values are passed as-is to tests (no copy whatsoever).

For example, if you pass a list or a dict as a parameter value, and the test case code mutates it, the mutations will be reflected in subsequent test case calls.

Note

pytest by default escapes any non-ascii characters used in unicode strings for the parametrization because it has several downsides. If however you would like to use unicode strings in parametrization and see them in the terminal as is (non-escaped), use this option in your pytest.ini:

```
[pytest]
disable_test_id_escaping_and_forfeit_all_rights_to_community_support = True
```

Keep in mind however that this might cause unwanted side effects and even bugs depending on the OS used and plugins currently installed, so use it at your own risk.

As designed in this example, only one pair of input/output values fails the simple test function. And as usual with test function arguments, you can see the input and output values in the traceback.

Note that you could also use the parametrize marker on a class or a module (see *How to mark test functions with attributes*) which would invoke several functions with the argument sets, for instance:

```
import pytest
@pytest.mark.parametrize("n,expected", [(1, 2), (3, 4)])
class TestClass:
    def test_simple_case(self, n, expected):
        assert n + 1 == expected
    def test_weird_simple_case(self, n, expected):
        assert (n * 1) + 1 == expected
```

To parametrize all tests in a module, you can assign to the pytestmark global variable:

```
import pytest
pytestmark = pytest.mark.parametrize("n,expected", [(1, 2), (3, 4)])
class TestClass:
   def test_simple_case(self, n, expected):
       assert n + 1 == expected
    def test_weird_simple_case(self, n, expected):
        assert (n * 1) + 1 == expected
```

It is also possible to mark individual test instances within parametrize, for example with the builtin mark.xfail:

```
# content of test_expectation.py
import pytest
@pytest.mark.parametrize(
    "test_input, expected",
    [("3+5", 8), ("2+4", 6), pytest.param("6*9", 42, marks=pytest.mark.xfail)],
```

```
def test_eval(test_input, expected):
    assert eval(test_input) == expected
```

Let's run this:

The one parameter set which caused a failure previously now shows up as an "xfailed" (expected to fail) test.

In case the values provided to parametrize result in an empty list - for example, if they're dynamically generated by some function - the behaviour of pytest is defined by the <code>empty_parameter_set_mark</code> option.

To get all combinations of multiple parametrized arguments you can stack parametrize decorators:

```
import pytest
@pytest.mark.parametrize("x", [0, 1])
@pytest.mark.parametrize("y", [2, 3])
def test_foo(x, y):
    pass
```

This will run the test with the arguments set to x=0/y=2, x=1/y=2, x=0/y=3, and x=1/y=3 exhausting parameters in the order of the decorators.

2.5.2 Basic pytest_generate_tests example

Sometimes you may want to implement your own parametrization scheme or implement some dynamism for determining the parameters or scope of a fixture. For this, you can use the pytest_generate_tests hook which is called when collecting a test function. Through the passed in metafunc object you can inspect the requesting test context and, most importantly, you can call metafunc.parametrize() to cause parametrization.

For example, let's say we want to run a test taking string inputs which we want to set via a new pytest command line option. Let's first write a simple test accepting a stringinput fixture function argument:

```
# content of test_strings.py

def test_valid_string(stringinput):
    assert stringinput.isalpha()
```

Now we add a conftest.py file containing the addition of a command line option and the parametrization of our test function:

```
# content of conftest.py

(continues on next page)
```

```
def pytest_addoption(parser):
    parser.addoption(
        "--stringinput",
        action="append",
        default=[],
        help="list of stringinputs to pass to test functions",
)

def pytest_generate_tests(metafunc):
    if "stringinput" in metafunc.fixturenames:
        metafunc.parametrize("stringinput", metafunc.config.getoption("stringinput"))
```

If we now pass two stringinput values, our test will run twice:

```
$ pytest -q --stringinput="hello" --stringinput="world" test_strings.py
..
2 passed in 0.12s
```

Let's also run with a stringinput that will lead to a failing test:

```
$ pytest -q --stringinput="!" test_strings.py
                                                             [100%]
_ test_valid_string[!] <sub>-</sub>
stringinput = '!'
   def test_valid_string(stringinput):
      assert stringinput.isalpha()
E
      AssertionError: assert False
       + where False = <built-in method isalpha of str object at 0xdeadbeef0001>()
\mathbf{E}
       + where <built-in method isalpha of str object at 0xdeadbeef0001> = '!'.
→isalpha
test_strings.py:4: AssertionError
========= short test summary info ===========================
FAILED test_strings.py::test_valid_string[!] - AssertionError: assert False
1 failed in 0.12s
```

As expected our test function fails.

If you don't specify a stringinput it will be skipped because metafunc.parametrize() will be called with an empty parameter list:

Note that when calling metafunc.parametrize multiple times with different parameter sets, all parameter names across those sets cannot be duplicated, otherwise an error will be raised.

2.5.3 More examples

For further examples, you might want to look at more parametrization examples.

2.6 How to use temporary directories and files in tests

2.6.1 The tmp_path fixture

You can use the tmp_path fixture which will provide a temporary directory unique to each test function.

tmp_path is a pathlib.Path object. Here is an example test usage:

```
# content of test_tmp_path.py
CONTENT = "content"

def test_create_file(tmp_path):
    d = tmp_path / "sub"
    d.mkdir()
    p = d / "hello.txt"
    p.write_text(CONTENT, encoding="utf-8")
    assert p.read_text(encoding="utf-8") == CONTENT
    assert len(list(tmp_path.iterdir())) == 1
    assert 0
```

Running this would result in a passed test except for the last assert 0 line which we use to look at values:

```
$ pytest test_tmp_path.py
platform linux -- Python 3.x.y, pytest-8.x.y, pluggy-1.x.y
rootdir: /home/sweet/project
collected 1 item
test_tmp_path.py F
                                                  [100%]
__ test_create_file _
tmp_path = PosixPath('PYTEST_TMPDIR/test_create_file0')
  def test_create_file(tmp_path):
     d = tmp_path / "sub"
     d.mkdir()
     p = d / "hello.txt"
     p.write_text(CONTENT, encoding="utf-8")
     assert p.read_text(encoding="utf-8") == CONTENT
     assert len(list(tmp_path.iterdir())) == 1
     assert 0
     assert 0
test_tmp_path.py:11: AssertionError
============ short test summary info ========================
FAILED test_tmp_path.py::test_create_file - assert 0
```

By default, pytest retains the temporary directory for the last 3 pytest invocations. Concurrent invocations of the same test function are supported by configuring the base temporary directory to be unique for each concurrent run. See *temporary directory location and retention* for details.

2.6.2 The tmp_path_factory fixture

The tmp_path_factory is a session-scoped fixture which can be used to create arbitrary temporary directories from any other fixture or test.

For example, suppose your test suite needs a large image on disk, which is generated procedurally. Instead of computing the same image for each test that uses it into its own tmp_path, you can generate it once per-session to save time:

```
# contents of conftest.py
import pytest

@pytest.fixture(scope="session")
def image_file(tmp_path_factory):
    img = compute_expensive_image()
    fn = tmp_path_factory.mktemp("data") / "img.png"
    img.save(fn)
    return fn

# contents of test_image.py
def test_histogram(image_file):
    img = load_image(image_file)
    # compute and test histogram
```

See tmp_path_factory API for details.

2.6.3 The tmpdir and tmpdir factory fixtures

The tmpdir and tmpdir_factory fixtures are similar to tmp_path and tmp_path_factory, but use/return legacy py.path.local objects rather than standard pathlib.Path objects.

1 Note

These days, it is preferred to use tmp_path and tmp_path_factory.

In order to help modernize old code bases, one can run pytest with the legacypath plugin disabled:

```
pytest -p no:legacypath
```

This will trigger errors on tests using the legacy paths. It can also be permanently set as part of the addopts parameter in the config file.

See tmpdir tmpdir_factory API for details.

2.6.4 Temporary directory location and retention

Temporary directories are by default created as sub-directories of the system temporary directory. The base name will be pytest-NUM where NUM will be incremented with each test run. By default, entries older than 3 temporary directories will be removed. This behavior can be configured with tmp_path_retention_count and tmp_path_retention policy.

Using the --basetemp option will remove the directory before every run, effectively meaning the temporary directories of only the most recent run will be kept.

You can override the default temporary directory setting like this:

```
pytest --basetemp=mydir
```

Warning

The contents of mydir will be completely removed, so make sure to use a directory for that purpose only.

When distributing tests on the local machine using pytest-xdist, care is taken to automatically configure a basetemp directory for the sub processes such that all temporary data lands below a single per-test run temporary directory.

2.7 How to monkeypatch/mock modules and environments

Sometimes tests need to invoke functionality which depends on global settings or which invokes code which cannot be easily tested such as network access. The monkeypatch fixture helps you to safely set/delete an attribute, dictionary item or environment variable, or to modify sys.path for importing.

The monkeypatch fixture provides these helper methods for safely patching and mocking functionality in tests:

- monkeypatch.setattr(obj, name, value, raising=True)
- monkeypatch.delattr(obj, name, raising=True)
- monkeypatch.setitem(mapping, name, value)
- monkeypatch.delitem(obj, name, raising=True)
- monkeypatch.setenv(name, value, prepend=None)
- monkeypatch.delenv(name, raising=True)
- monkeypatch.syspath prepend(path)
- monkeypatch.chdir(path)
- monkeypatch.context()

All modifications will be undone after the requesting test function or fixture has finished. The raising parameter determines if a KeyError or AttributeError will be raised if the target of the set/deletion operation does not exist.

Consider the following scenarios:

1. Modifying the behavior of a function or the property of a class for a test e.g. there is an API call or database connection you will not make for a test but you know what the expected output should be. Use monkeypatch.setattr to patch the function or property with your desired testing behavior. This can include your own functions. Use monkeypatch. delattr to remove the function or property for the test.

- 2. Modifying the values of dictionaries e.g. you have a global configuration that you want to modify for certain test cases. Use monkeypatch.setitem to patch the dictionary for the test. monkeypatch.delitem can be used to remove items.
- 3. Modifying environment variables for a test e.g. to test program behavior if an environment variable is missing, or to set multiple values to a known variable. monkeypatch.setenv and monkeypatch.delenv can be used for these patches.
- 4. Use monkeypatch.setenv("PATH", value, prepend=os.pathsep) to modify \$PATH, and monkeypatch.chdir to change the context of the current working directory during a test.
- 5. Use monkeypatch.syspath_prepend to modify sys.path which will also call pkg_resources. fixup_namespace_packages and importlib.invalidate_caches().
- 6. Use monkeypatch.context to apply patches only in a specific scope, which can help control teardown of complex fixtures or patches to the stdlib.

See the monkeypatch blog post for some introduction material and a discussion of its motivation.

2.7.1 Monkeypatching functions

Consider a scenario where you are working with user directories. In the context of testing, you do not want your test to depend on the running user. monkeypatch can be used to patch functions dependent on the user to always return a specific value.

In this example, <code>monkeypatch.setattr</code> is used to patch <code>Path.home</code> so that the known testing path <code>Path("/abc")</code> is always used when the test is run. This removes any dependency on the running user for testing purposes. <code>monkeypatch.setattr</code> must be called before the function which will use the patched function is called. After the test function finishes the <code>Path.home</code> modification will be undone.

```
# contents of test_module.py with source code and the test
from pathlib import Path
def getssh():
    """Simple function to return expanded homedir ssh path."""
    return Path.home() / ".ssh"
def test_getssh (monkeypatch):
    # mocked return function to replace Path.home
    # always return '/abc'
   def mockreturn():
       return Path ("/abc")
    # Application of the monkeypatch to replace Path.home
    # with the behavior of mockreturn defined above.
   monkeypatch.setattr(Path, "home", mockreturn)
    # Calling getssh() will use mockreturn in place of Path.home
    # for this test with the monkeypatch.
   x = getssh()
    assert x == Path("/abc/.ssh")
```

2.7.2 Monkeypatching returned objects: building mock classes

monkeypatch.setattr can be used in conjunction with classes to mock returned objects from functions instead of values. Imagine a simple function to take an API url and return the json response.

```
# contents of app.py, a simple API retrieval example
import requests

def get_json(url):
    """Takes a URL, and returns the JSON."""
    r = requests.get(url)
    return r.json()
```

We need to mock r, the returned response object for testing purposes. The mock of r needs a .json() method which returns a dictionary. This can be done in our test file by defining a class to represent r.

```
# contents of test_app.py, a simple test for our API retrieval
# import requests for the purposes of monkeypatching
import requests
# our app.py that includes the get_json() function
# this is the previous code block example
import app
# custom class to be the mock return value
# will override the requests. Response returned from requests.get
class MockResponse:
    # mock json() method always returns a specific testing dictionary
    @staticmethod
   def json():
       return {"mock_key": "mock_response"}
def test_get_json(monkeypatch):
    # Any arguments may be passed and mock_get() will always return our
    # mocked object, which only has the .json() method.
   def mock_get(*args, **kwargs):
       return MockResponse()
    # apply the monkeypatch for requests.get to mock_get
   monkeypatch.setattr(requests, "get", mock_get)
    # app.get_json, which contains requests.get, uses the monkeypatch
    result = app.get_json("https://fakeurl")
    assert result["mock_key"] == "mock_response"
```

monkeypatch applies the mock for requests.get with our mock_get function. The mock_get function returns an instance of the MockResponse class, which has a json () method defined to return a known testing dictionary and does not require any outside API connection.

You can build the MockResponse class with the appropriate degree of complexity for the scenario you are testing. For instance, it could include an ok property that always returns True, or return different values from the json() mocked method based on input strings.

This mock can be shared across tests using a fixture:

```
# contents of test_app.py, a simple test for our API retrieval
import pytest
import requests
# app.py that includes the get_json() function
import app
# custom class to be the mock return value of requests.get()
class MockResponse:
   @staticmethod
   def json():
        return {"mock_key": "mock_response"}
# monkeypatched requests.get moved to a fixture
@pytest.fixture
def mock_response(monkeypatch):
    """Requests.get() mocked to return {'mock_key':'mock_response'}."""
   def mock_get(*args, **kwargs):
       return MockResponse()
   monkeypatch.setattr(requests, "get", mock_get)
# notice our test uses the custom fixture instead of monkeypatch directly
def test_get_json(mock_response):
   result = app.get_json("https://fakeurl")
   assert result["mock_key"] == "mock_response"
```

Furthermore, if the mock was designed to be applied to all tests, the fixture could be moved to a conftest.py file and use the with autouse=True option.

2.7.3 Global patch example: preventing "requests" from remote operations

If you want to prevent the "requests" library from performing http requests in all your tests, you can do:

```
# contents of conftest.py
import pytest

@pytest.fixture(autouse=True)
def no_requests(monkeypatch):
    """Remove requests.sessions.Session.request for all tests."""
    monkeypatch.delattr("requests.sessions.Session.request")
```

This autouse fixture will be executed for each test function and it will delete the method request.session. Session.request so that any attempts within tests to create http requests will fail.

1 Note

Be advised that it is not recommended to patch builtin functions such as open, compile, etc., because it might break pytest's internals. If that's unavoidable, passing --tb=native, --assert=plain and --capture=no might help although there's no guarantee.

1 Note

Mind that patching stdlib functions and some third-party libraries used by pytest might break pytest itself, therefore in those cases it is recommended to use <code>MonkeyPatch.context()</code> to limit the patching to the block you want tested:

```
import functools

def test_partial(monkeypatch):
    with monkeypatch.context() as m:
        m.setattr(functools, "partial", 3)
        assert functools.partial == 3
See #3290 for details.
```

2.7.4 Monkeypatching environment variables

If you are working with environment variables you often need to safely change the values or delete them from the system for testing purposes. monkeypatch provides a mechanism to do this using the setenv and delenv method. Our example code to test:

```
# contents of our original code file e.g. code.py
import os

def get_os_user_lower():
    """Simple retrieval function.
    Returns lowercase USER or raises OSError."""
    username = os.getenv("USER")

    if username is None:
        raise OSError("USER environment is not set.")

    return username.lower()
```

There are two potential paths. First, the USER environment variable is set to a value. Second, the USER environment variable does not exist. Using monkeypatch both paths can be safely tested without impacting the running environment:

```
# contents of our test file e.g. test_code.py
import pytest

def test_upper_to_lower(monkeypatch):
    """Set the USER env var to assert the behavior."""
    monkeypatch.setenv("USER", "TestingUser")
    assert get_os_user_lower() == "testinguser"

def test_raise_exception(monkeypatch):
    """Remove the USER env var and assert OSError is raised."""
    monkeypatch.delenv("USER", raising=False)

with pytest.raises(OSError):
    _ = get_os_user_lower()
```

This behavior can be moved into fixture structures and shared across tests:

```
# contents of our test file e.g. test_code.py
import pytest

@pytest.fixture
def mock_env_user(monkeypatch):
    monkeypatch.setenv("USER", "TestingUser")

@pytest.fixture
def mock_env_missing(monkeypatch):
    monkeypatch.delenv("USER", raising=False)

# notice the tests reference the fixtures for mocks
def test_upper_to_lower(mock_env_user):
    assert get_os_user_lower() == "testinguser"

def test_raise_exception(mock_env_missing):
    with pytest.raises(OSError):
    _ = get_os_user_lower()
```

2.7.5 Monkeypatching dictionaries

monkeypatch.setitem can be used to safely set the values of dictionaries to specific values during tests. Take this simplified connection string example:

```
# contents of app.py to generate a simple connection string
DEFAULT_CONFIG = {"user": "user1", "database": "db1"}

def create_connection_string(config=None):
    """Creates a connection string from input or defaults."""
    config = config or DEFAULT_CONFIG
    return f"User Id={config['user']}; Location={config['database']};"
```

For testing purposes we can patch the DEFAULT_CONFIG dictionary to specific values.

```
# contents of test_app.py
# app.py with the connection string function (prior code block)
import app

def test_connection(monkeypatch):
    # Patch the values of DEFAULT_CONFIG to specific
    # testing values only for this test.
    monkeypatch.setitem(app.DEFAULT_CONFIG, "user", "test_user")
    monkeypatch.setitem(app.DEFAULT_CONFIG, "database", "test_db")

# expected result based on the mocks
    expected = "User Id=test_user; Location=test_db;"

# the test uses the monkeypatched dictionary settings
    result = app.create_connection_string()
    assert result == expected
```

You can use the monkeypatch.delitem to remove values.

The modularity of fixtures gives you the flexibility to define separate fixtures for each potential mock and reference them in the needed tests.

```
# contents of test_app.py
import pytest
# app.py with the connection string function
import app
# all of the mocks are moved into separated fixtures
@pytest.fixture
def mock_test_user(monkeypatch):
    """Set the DEFAULT_CONFIG user to test_user."""
   monkeypatch.setitem(app.DEFAULT_CONFIG, "user", "test_user")
@pytest.fixture
def mock_test_database(monkeypatch):
    """Set the DEFAULT_CONFIG database to test_db."""
    monkeypatch.setitem(app.DEFAULT_CONFIG, "database", "test_db")
@pytest.fixture
def mock_missing_default_user(monkeypatch):
    """Remove the user key from DEFAULT_CONFIG"""
   monkeypatch.delitem(app.DEFAULT_CONFIG, "user", raising=False)
# tests reference only the fixture mocks that are needed
def test_connection(mock_test_user, mock_test_database):
   expected = "User Id=test_user; Location=test_db;"
    result = app.create_connection_string()
    assert result == expected
def test_missing_user(mock_missing_default_user):
   with pytest.raises(KeyError):
       _ = app.create_connection_string()
```

2.7.6 API Reference

Consult the docs for the MonkeyPatch class.

2.8 How to run doctests

By default, all files matching the test*.txt pattern will be run through the python standard doctest module. You can change the pattern by issuing:

```
pytest --doctest-glob="*.rst"
```

on the command line. --doctest-glob can be given multiple times in the command-line.

If you then have a text file like this:

```
# content of test_example.txt
hello this is a doctest
>>> x = 3
>>> x
3
```

then you can just invoke pytest directly:

By default, pytest will collect test*.txt files looking for doctest directives, but you can pass additional globs using the --doctest-glob option (multi-allowed).

In addition to text files, you can also execute doctests directly from docstrings of your classes and functions, including from test modules:

```
# content of mymodule.py
def something():
    """a doctest in a docstring
    >>> something()
    42
    """
    return 42
```

You can make these changes permanent in your project by putting them into a pytest.ini file like this:

```
# content of pytest.ini
[pytest]
addopts = --doctest-modules
```

2.8.1 Encoding

The default encoding is UTF-8, but you can specify the encoding that will be used for those doctest files using the doctest_encoding ini option:

```
# content of pytest.ini
[pytest]
doctest_encoding = latin1
```

2.8.2 Using 'doctest' options

Python's standard doctest module provides some options to configure the strictness of doctest tests. In pytest, you can enable those flags using the configuration file.

For example, to make pytest ignore trailing whitespaces and ignore lengthy exception stack traces you can just write:

```
[pytest]
doctest_optionflags = NORMALIZE_WHITESPACE IGNORE_EXCEPTION_DETAIL
```

Alternatively, options can be enabled by an inline comment in the doc test itself:

```
>>> something_that_raises()  # doctest: +IGNORE_EXCEPTION_DETAIL
Traceback (most recent call last):
ValueError: ...
```

pytest also introduces new options:

- ALLOW_UNICODE: when enabled, the u prefix is stripped from unicode strings in expected doctest output. This allows doctests to run in Python 2 and Python 3 unchanged.
- ALLOW_BYTES: similarly, the b prefix is stripped from byte strings in expected doctest output.
- NUMBER: when enabled, floating-point numbers only need to match as far as the precision you have written in the expected doctest output. The numbers are compared using <code>pytest.approx()</code> with relative tolerance equal to the precision. For example, the following output would only need to match to 2 decimal places when comparing 3.14 to <code>pytest.approx(math.pi, rel=10**-2)</code>:

```
>>> math.pi
3.14
```

If you wrote 3.1416 then the actual output would need to match to approximately 4 decimal places; and so on.

This avoids false positives caused by limited floating-point precision, like this:

```
Expected:
    0.233
Got:
    0.2330000000000001
```

NUMBER also supports lists of floating-point numbers – in fact, it matches floating-point numbers appearing anywhere in the output, even inside a string! This means that it may not be appropriate to enable globally in doctest_optionflags in your configuration file.

Added in version 5.1.

2.8.3 Continue on failure

By default, pytest would report only the first failure for a given doctest. If you want to continue the test even when you have failures, do:

```
pytest --doctest-modules --doctest-continue-on-failure
```

2.8.4 Output format

You can change the diff output format on failure for your doctests by using one of standard doctest modules format in options (see doctest.REPORT_UDIFF, doctest.REPORT_CDIFF, doctest.REPORT_NDIFF, doctest.REPORT_ONLY_FIRST_FAILURE):

```
pytest --doctest-modules --doctest-report none
pytest --doctest-modules --doctest-report udiff
pytest --doctest-modules --doctest-report cdiff
pytest --doctest-modules --doctest-report ndiff
pytest --doctest-modules --doctest-report only_first_failure
```

2.8.5 pytest-specific features

Some features are provided to make writing doctests easier or with better integration with your existing test suite. Keep in mind however that by using those features you will make your doctests incompatible with the standard doctests module.

Using fixtures

It is possible to use fixtures using the getfixture helper:

```
# content of example.rst
>>> tmp = getfixture('tmp_path')
>>> ...
>>>
```

Note that the fixture needs to be defined in a place visible by pytest, for example, a conftest.py file or plugin; normal python files containing docstrings are not normally scanned for fixtures unless explicitly configured by python_files.

Also, the usefixtures mark and fixtures marked as autouse are supported when executing text doctest files.

'doctest namespace' fixture

The doctest_namespace fixture can be used to inject items into the namespace in which your doctests run. It is intended to be used within your own fixtures to provide the tests that use them with context.

doctest_namespace is a standard dict object into which you place the objects you want to appear in the doctest namespace:

```
# content of conftest.py
import pytest
import numpy

@pytest.fixture(autouse=True)
def add_np(doctest_namespace):
    doctest_namespace["np"] = numpy
```

which can then be used in your doctests directly:

```
# content of numpy.py
def arange():
    """
    >>> a = np.arange(10)
    >>> len(a)
    10
    """
```

Note that like the normal conftest.py, the fixtures are discovered in the directory tree conftest is in. Meaning that if you put your doctest with your source code, the relevant conftest.py needs to be in the same directory tree. Fixtures will not be discovered in a sibling directory tree!

Skipping tests

For the same reasons one might want to skip normal tests, it is also possible to skip tests inside doctests.

To skip a single check inside a doctest you can use the standard doctest. SKIP directive:

```
def test_random(y):
    """
    >>> random.random() # doctest: +SKIP
    0.156231223
    >>> 1 + 1
    2
    """
```

This will skip the first check, but not the second.

pytest also allows using the standard pytest functions pytest.skip() and pytest.xfail() inside doctests, which might be useful because you can then skip/xfail tests based on external conditions:

However using those functions is discouraged because it reduces the readability of the docstring.

1 Note

pytest.skip() and pytest.xfail() behave differently depending if the doctests are in a Python file (in docstrings) or a text file containing doctests intermingled with text:

- Python modules (docstrings): the functions only act in that specific docstring, letting the other docstrings in the same module execute as normal.
- Text files: the functions will skip/xfail the checks for the rest of the entire file.

2.8.6 Alternatives

While the built-in pytest support provides a good set of functionalities for using doctests, if you use them extensively you might be interested in those external packages which add many more features, and include pytest integration:

- pytest-doctestplus: provides advanced doctest support and enables the testing of reStructuredText (".rst") files.
- Sybil: provides a way to test examples in your documentation by parsing them from the documentation source and evaluating the parsed examples as part of your normal test run.

2.9 How to re-run failed tests and maintain state between test runs

2.9.1 Usage

The plugin provides two command line options to rerun failures from the last pytest invocation:

- --lf, --last-failed to only re-run the failures.
- \bullet --ff, --failed-first to run the failures first and then the rest of the tests.

For cleanup (usually not needed), a --cache-clear option allows to remove all cross-session cache contents ahead of a test run.

Other plugins may access the *config.cache* object to set/get **json encodable** values between pytest invocations.



This plugin is enabled by default, but can be disabled if needed: see *Deactivating / unregistering a plugin by name* (the internal name for this plugin is cacheprovider).

2.9.2 Rerunning only failures or failures first

First, let's create 50 test invocation of which only 2 fail:

```
# content of test_50.py
import pytest

@pytest.mark.parametrize("i", range(50))
def test_num(i):
```

```
if i in (17, 25):
    pytest.fail("bad luck")
```

If you run this for the first time you will see two failures:

```
$ pytest -q
[100%]
__ test_num[17] _
i = 17
   @pytest.mark.parametrize("i", range(50))
  def test_num(i):
     if i in (17, 25):
        pytest.fail("bad luck")
Ε
        Failed: bad luck
test_50.py:7: Failed
                     ____ test_num[25] _____
i = 25
   @pytest.mark.parametrize("i", range(50))
  def test_num(i):
     if i in (17, 25):
        pytest.fail("bad luck")
        Failed: bad luck
test_50.py:7: Failed
======= short test summary info ===============
FAILED test_50.py::test_num[17] - Failed: bad luck
FAILED test_50.py::test_num[25] - Failed: bad luck
2 failed, 48 passed in 0.12s
```

If you then run it with --lf:

```
$ pytest --lf
================== test session starts ======================
platform linux -- Python 3.x.y, pytest-8.x.y, pluggy-1.x.y
rootdir: /home/sweet/project
collected 2 items
run-last-failure: rerun previous 2 failures
test_50.py FF
                                                        [100%]
 _____test_num[17] __
i = 17
   @pytest.mark.parametrize("i", range(50))
   def test_num(i):
      if i in (17, 25):
         pytest.fail("bad luck")
Ε
         Failed: bad luck
```

You have run only the two failing tests from the last run, while the 48 passing tests have not been run ("deselected").

Now, if you run with the --ff option, all tests will be run but the first previous failures will be executed first (as can be seen from the series of FF and dots):

```
$ pytest --ff
platform linux -- Python 3.x.y, pytest-8.x.y, pluggy-1.x.y
rootdir: /home/sweet/project
collected 50 items
run-last-failure: rerun previous 2 failures first
test_50.py FF.....
                                                      [100%]
_____ test_num[17] _
i = 17
   @pytest.mark.parametrize("i", range(50))
   def test_num(i):
      if i in (17, 25):
         pytest.fail("bad luck")
Ε
         Failed: bad luck
test_50.py:7: Failed
                     ____ test_num[25] __
i = 25
   @pytest.mark.parametrize("i", range(50))
   def test_num(i):
      if i in (17, 25):
         pytest.fail("bad luck")
         Failed: bad luck
test_50.py:7: Failed
======================== short test summary info ==============================
FAILED test_50.py::test_num[17] - Failed: bad luck
FAILED test_50.py::test_num[25] - Failed: bad luck
```

New --nf, --new-first options: run new tests first followed by the rest of the tests, in both cases tests are also sorted by the file modified time, with more recent files coming first.

2.9.3 Behavior when no tests failed in the last run

The --lfnf/--last-failed-no-failures option governs the behavior of --last-failed. Determines whether to execute tests when there are no previously (known) failures or when no cached lastfailed data was found.

There are two options:

- all: when there are no known test failures, runs all tests (the full test suite). This is the default.
- none: when there are no known test failures, just emits a message stating this and exit successfully.

Example:

```
pytest --last-failed --last-failed-no-failures all # runs the full test suite→
  (default behavior)
pytest --last-failed --last-failed-no-failures none # runs no tests and exits→
  successfully
```

2.9.4 The new config.cache object

Plugins or conftest.py support code can get a cached value using the pytest config object. Here is a basic example plugin which implements a *fixture* which re-uses previously created state across pytest invocations:

```
# content of test_caching.py
import pytest

def expensive_computation():
    print("running expensive computation...")

@pytest.fixture
def mydata(pytestconfig):
    val = pytestconfig.cache.get("example/value", None)
    if val is None:
        expensive_computation()
        val = 42
        pytestconfig.cache.set("example/value", val)
    return val

def test_function(mydata):
    assert mydata == 23
```

If you run this command for the first time, you can see the print statement:

If you run it a second time, the value will be retrieved from the cache and nothing will be printed:

See the config.cache fixture for more details.

2.9.5 Inspecting Cache content

You can always peek at the content of the cache using the --cache-show command line option:

--cache-show takes an optional argument to specify a glob pattern for filtering:

2.9.6 Clearing Cache content

You can instruct pytest to clear all cache files and values by adding the --cache-clear option like this:

```
pytest --cache-clear
```

This is recommended for invocations from Continuous Integration servers where isolation and correctness is more important than speed.

2.9.7 Stepwise

As an alternative to --lf -x, especially for cases where you expect a large part of the test suite will fail, --sw, --stepwise allows you to fix them one at a time. The test suite will run until the first failure and then stop. At the next invocation, tests will continue from the last failing test and then run until the next failing test. You may use the --stepwise-skip option to ignore one failing test and stop the test execution on the second failing test instead. This is useful if you get stuck on a failing test and just want to ignore it until later. Providing --stepwise-skip will also enable --stepwise implicitly.

2.10 How to manage logging

pytest captures log messages of level WARNING or above automatically and displays them in their own section for each failed test in the same manner as captured stdout and stderr.

Running without options:

```
pytest
```

Shows failed tests like so:

By default each captured log message shows the module, line number, log level and message.

If desired the log and date format can be specified to anything that the logging module supports by passing specific formatting options:

Shows failed tests like so:

These options can also be customized through pytest.ini file:

```
[pytest]
log_format = %(asctime)s %(levelname)s %(message)s
log_date_format = %Y-%m-%d %H:%M:%S
```

Specific loggers can be disabled via --log-disable={logger_name}. This argument can be passed multiple times:

```
pytest --log-disable=main --log-disable=testing
```

Further it is possible to disable reporting of captured content (stdout, stderr and logs) on failed tests completely with:

```
pytest --show-capture=no
```

2.10.1 caplog fixture

Inside tests it is possible to change the log level for the captured log messages. This is supported by the caplog fixture:

```
def test_foo(caplog):
    caplog.set_level(logging.INFO)
```

By default the level is set on the root logger, however as a convenience it is also possible to set the log level of any logger:

```
def test_foo(caplog):
    caplog.set_level(logging.CRITICAL, logger="root.baz")
```

The log levels set are restored automatically at the end of the test.

It is also possible to use a context manager to temporarily change the log level inside a with block:

```
def test_bar(caplog):
    with caplog.at_level(logging.INFO):
        pass
```

Again, by default the level of the root logger is affected but the level of any logger can be changed instead with:

```
def test_bar(caplog):
    with caplog.at_level(logging.CRITICAL, logger="root.baz"):
        pass
```

Lastly all the logs sent to the logger during the test run are made available on the fixture in the form of both the logging. LogRecord instances and the final log text. This is useful for when you want to assert on the contents of a message:

```
def test_baz(caplog):
    func_under_test()
    for record in caplog.records:
        assert record.levelname != "CRITICAL"
    assert "wally" not in caplog.text
```

For all the available attributes of the log records see the logging. LogRecord class.

You can also resort to record_tuples if all you want to do is to ensure, that certain messages have been logged under a given logger name with a given severity and message:

```
def test_foo(caplog):
    logging.getLogger().info("boo %s", "arg")

assert caplog.record_tuples == [("root", logging.INFO, "boo arg")]
```

You can call caplog.clear() to reset the captured log records in a test:

```
def test_something_with_clearing_records(caplog):
    some_method_that_creates_log_records()
    caplog.clear()
    your_test_method()
    assert ["Foo"] == [rec.message for rec in caplog.records]
```

The caplog.records attribute contains records from the current stage only, so inside the setup phase it contains only setup logs, same with the call and teardown phases.

To access logs from other stages, use the caplog.get_records (when) method. As an example, if you want to make sure that tests which use a certain fixture never log any warnings, you can inspect the records for the setup and call stages during teardown like so:

The full API is available at pytest.LogCaptureFixture.

A Warning

The caplog fixture adds a handler to the root logger to capture logs. If the root logger is modified during a test, for example with logging.config.dictConfig, this handler may be removed and cause no logs to be captured. To avoid this, ensure that any root logger configuration only adds to the existing handlers.

2.10.2 Live Logs

By setting the log_cli configuration option to true, pytest will output logging records as they are emitted directly into the console.

You can specify the logging level for which log records with equal or higher level are printed to the console by passing --log-cli-level. This setting accepts the logging level names or numeric values as seen in logging's documentation.

Additionally, you can also specify --log-cli-format and --log-cli-date-format which mirror and default to --log-format and --log-date-format if not provided, but are applied only to the console logging handler.

All of the CLI log options can also be set in the configuration INI file. The option names are:

- log cli level
- log_cli_format
- log_cli_date_format

If you need to record the whole test suite logging calls to a file, you can pass --log-file=/path/to/log/file. This log file is opened in write mode by default which means that it will be overwritten at each run tests session. If you'd like the file opened in append mode instead, then you can pass --log-file-mode=a. Note that relative paths for the log-file location, whether passed on the CLI or declared in a config file, are always resolved relative to the current working directory.

You can also specify the logging level for the log file by passing --log-file-level. This setting accepts the logging level names or numeric values as seen in logging's documentation.

Additionally, you can also specify —log-file-format and —log-file-date-format which are equal to —log-format and —log-date-format but are applied to the log file logging handler.

All of the log file options can also be set in the configuration INI file. The option names are:

- log_file
- log_file_mode
- log_file_level
- log_file_format
- log file date format

You can call set_log_path() to customize the log_file path dynamically. This functionality is considered **experimental**. Note that set_log_path() respects the log_file_mode option.

2.10.3 Customizing Colors

Log levels are colored if colored terminal output is enabled. Changing from default colors or putting color on custom log levels is supported through add_color_level(). Example:

```
@pytest.hookimpl(trylast=True)
def pytest_configure(config):
    logging_plugin = config.pluginmanager.get_plugin("logging-plugin")

# Change color on existing log level
    logging_plugin.log_cli_handler.formatter.add_color_level(logging.INFO, "cyan")

# Add color to a custom log level (a custom log level `SPAM` is already set up)
    logging_plugin.log_cli_handler.formatter.add_color_level(logging.SPAM, "blue")
```

Warning

This feature and its API are considered **experimental** and might change between releases without a deprecation notice.

2.10.4 Release notes

This feature was introduced as a drop-in replacement for the pytest-catchlog plugin and they conflict with each other. The backward compatibility API with pytest-capturelog has been dropped when this feature was introduced, so if for that reason you still need pytest-catchlog you can disable the internal feature by adding to your pytest.ini:

```
[pytest]
addopts=-p no:logging
```

2.10.5 Incompatible changes in pytest 3.4

This feature was introduced in 3.3 and some **incompatible changes** have been made in 3.4 after community feedback:

- Log levels are no longer changed unless explicitly requested by the <code>log_level</code> configuration or <code>--log-level</code> command-line options. This allows users to configure logger objects themselves. Setting <code>log_level</code> will set the level that is captured globally so if a specific test requires a lower level than this, use the <code>caplog.set_level()</code> functionality otherwise that test will be prone to failure.
- Live Logs is now disabled by default and can be enabled setting the log_cli configuration option to true. When enabled, the verbosity is increased so logging for each test is visible.
- Live Logs are now sent to sys. stdout and no longer require the -s command-line option to work.

If you want to partially restore the logging behavior of version 3.3, you can add this options to your ini file:

```
[pytest]
log_cli=true
log_level=NOTSET
```

More details about the discussion that lead to this changes can be read in #3013.

2.11 How to capture stdout/stderr output

2.11.1 Default stdout/stderr/stdin capturing behaviour

During test execution any output sent to stdout and stderr is captured. If a test or a setup method fails its according captured output will usually be shown along with the failure traceback. (this behavior can be configured by the --show-capture command-line option).

In addition, stdin is set to a "null" object which will fail on attempts to read from it because it is rarely desired to wait for interactive input when running automated tests.

By default capturing is done by intercepting writes to low level file descriptors. This allows to capture output from simple print statements as well as output from a subprocess started by a test.

2.11.2 Setting capturing methods or disabling capturing

There are three ways in which pytest can perform capturing:

- fd (file descriptor) level capturing (default): All writes going to the operating system file descriptors 1 and 2 will be captured.
- sys level capturing: Only writes to Python files sys.stdout and sys.stderr will be captured. No capturing
 of writes to filedescriptors is performed.
- tee-sys capturing: Python writes to sys.stdout and sys.stderr will be captured, however the writes will also be passed-through to the actual sys.stdout and sys.stderr. This allows output to be 'live printed' and captured for plugin use, such as junitxml (new in pytest 5.4).

You can influence output capturing mechanisms from the command line:

```
pytest -s  # disable all capturing
pytest --capture=sys  # replace sys.stdout/stderr with in-mem files
pytest --capture=fd  # also point filedescriptors 1 and 2 to temp file
pytest --capture=tee-sys  # combines 'sys' and '-s', capturing sys.stdout/stderr
  # and passing it along to the actual sys.stdout/stderr
```

2.11.3 Using print statements for debugging

One primary benefit of the default capturing of stdout/stderr output is that you can use print statements for debugging:

```
# content of test_module.py

def setup_function(function):
    print("setting up", function)

def test_func1():
    assert True

def test_func2():
    assert False
```

and running this module will show you precisely the output of the failing function and hide the other one:

2.11.4 Accessing captured output from a test function

The capsys, capsysbinary, capfd, and capfdbinary fixtures allow access to stdout/stderr output created during test execution. Here is an example test function that performs some output related checks:

```
def test_myoutput(capsys): # or use "capfd" for fd-level
    print("hello")
    sys.stderr.write("world\n")
    captured = capsys.readouterr()
    assert captured.out == "hello\n"
    assert captured.err == "world\n"
    print("next")
    captured = capsys.readouterr()
    assert captured.out == "next\n"
```

The readouterr() call snapshots the output so far - and capturing will be continued. After the test function finishes the original streams will be restored. Using capsys this way frees your test from having to care about setting/resetting output streams and also interacts well with pytest's own per-test capturing.

If you want to capture on filedescriptor level you can use the capfd fixture which offers the exact same interface but allows to also capture output from libraries or subprocesses that directly write to operating system level output streams (FD1 and FD2).

The return value from readouterr changed to a named tuple with two attributes, out and err.

If the code under test writes non-textual data, you can capture this using the capsysbinary fixture which instead returns bytes from the readouterr method.

If the code under test writes non-textual data, you can capture this using the capfdbinary fixture which instead returns bytes from the readouterr method. The capfdbinary fixture operates on the filedescriptor level.

To temporarily disable capture within a test, both capsys and capfd have a disabled() method that can be used as a context manager, disabling capture inside the with block:

```
def test_disabling_capturing(capsys):
    print("this output is captured")
    with capsys.disabled():
        print("output not captured, going directly to sys.stdout")
    print("this output is also captured")
```

2.12 How to capture warnings

Starting from version 3.1, pytest now automatically catches warnings during test execution and displays them at the end of the session:

```
# content of test_show_warnings.py
import warnings

def api_v1():
    warnings.warn(UserWarning("api v1, should use functions from v2"))
    return 1

def test_one():
    assert api_v1() == 1
```

Running pytest now produces this output:

2.12.1 Controlling warnings

Similar to Python's warning filter and $-\mathbb{W}$ option flag, pytest provides its own $-\mathbb{W}$ flag to control which warnings are ignored, displayed, or turned into errors. See the warning filter documentation for more advanced use-cases.

This code sample shows how to treat any UserWarning category class of warning as an error:

The same option can be set in the pytest.ini or pyproject.toml file using the filterwarnings ini option. For example, the configuration below will ignore all user warnings and specific deprecation warnings matching a regex, but will transform all other warnings into errors.

```
# pytest.ini
[pytest]
filterwarnings =
    error
    ignore::UserWarning
    ignore:function ham\(\) is deprecated:DeprecationWarning
```

```
# pyproject.toml
[tool.pytest.ini_options]
filterwarnings = [
    "error",
    "ignore::UserWarning",
    # note the use of single quote below to denote "raw" strings in TOML
    'ignore:function ham\(\) is deprecated:DeprecationWarning',
]
```

When a warning matches more than one option in the list, the action for the last matching option is performed.

1 Note

The -W flag and the filterwarnings ini option use warning filters that are similar in structure, but each configuration option interprets its filter differently. For example, *message* in filterwarnings is a string containing a regular expression that the start of the warning message must match, case-insensitively, while *message* in -W is a literal string that the start of the warning message must contain (case-insensitively), ignoring any whitespace at the start or end of message. Consult the warning filter documentation for more details.

2.12.2 @pytest.mark.filterwarnings

You can use the <code>@pytest.mark.filterwarnings</code> to add warning filters to specific test items, allowing you to have finer control of which warnings should be captured at test, class or even module level:

```
def api_v1():
    warnings.warn(UserWarning("api v1, should use functions from v2"))
    return 1

@pytest.mark.filterwarnings("ignore:api v1")
```

```
def test_one():
    assert api_v1() == 1
```

Filters applied using a mark take precedence over filters passed on the command line or configured by the filter-warnings ini option.

You may apply a filter to all tests of a class by using the filterwarnings mark as a class decorator or to all tests in a module by setting the pytestmark variable:

```
# turns all warnings into errors for this module
pytestmark = pytest.mark.filterwarnings("error")
```

Credits go to Florian Schulze for the reference implementation in the pytest-warnings plugin.

2.12.3 Disabling warnings summary

Although not recommended, you can use the --disable-warnings command-line option to suppress the warning summary entirely from the test run output.

2.12.4 Disabling warning capture entirely

This plugin is enabled by default but can be disabled entirely in your pytest.ini file with:

```
[pytest]
addopts = -p no:warnings
```

Or passing -p no: warnings in the command-line. This might be useful if your test suites handles warnings using an external system.

2.12.5 DeprecationWarning and PendingDeprecationWarning

By default pytest will display DeprecationWarning and PendingDeprecationWarning warnings from user code and third-party libraries, as recommended by PEP 565. This helps users keep their code modern and avoid breakages when deprecated warnings are effectively removed.

However, in the specific case where users capture any type of warnings in their test, either with <code>pytest.warns()</code>, <code>pytest.deprecated_call()</code> or using the <code>recwarn</code> fixture, no warning will be displayed at all.

Sometimes it is useful to hide some specific deprecation warnings that happen in code that you have no control over (such as third-party libraries), in which case you might use the warning filters options (ini or marks) to ignore those warnings.

For example:

```
[pytest]
filterwarnings =
  ignore:.*U.*mode is deprecated:DeprecationWarning
```

This will ignore all warnings of type DeprecationWarning where the start of the message matches the regular expression ".*U.*mode is deprecated".

See @pytest.mark.filterwarnings and Controlling warnings for more examples.

1 Note

If warnings are configured at the interpreter level, using the PYTHONWARNINGS environment variable or the -W command-line option, pytest will not configure any filters by default.

Also pytest doesn't follow PEP 506 suggestion of resetting all warning filters because it might break test suites that configure warning filters themselves by calling warnings.simplefilter() (see #2430 for an example of that).

2.12.6 Ensuring code triggers a deprecation warning

You can also use <code>pytest.deprecated_call()</code> for checking that a certain function call triggers a <code>DeprecationWarning</code> or <code>PendingDeprecationWarning</code>:

```
def test_myfunction_deprecated():
    with pytest.deprecated_call():
        myfunction(17)
```

This test will fail if myfunction does not issue a deprecation warning when called with a 17 argument.

2.12.7 Asserting warnings with the warns function

You can check that code raises a particular warning using pytest.warns(), which works in a similar manner to raises (except that raises does not capture all exceptions, only the expected_exception):

```
import warnings
import pytest

def test_warning():
    with pytest.warns(UserWarning):
        warnings.warn("my warning", UserWarning)
```

The test will fail if the warning in question is not raised. Use the keyword argument match to assert that the warning matches a text or regex. To match a literal string that may contain regular expression metacharacters like (or ., the pattern can first be escaped with re.escape.

Some examples:

```
Failed: DID NOT WARN. No warnings of type ... UserWarning... were emitted...

>>> with warns(UserWarning, match=re.escape("issue with foo() func")):
... warnings.warn("issue with foo() func")
...
```

You can also call pytest.warns() on a function or code string:

```
pytest.warns(expected_warning, func, *args, **kwargs)
pytest.warns(expected_warning, "func(*args, **kwargs)")
```

The function also returns a list of all raised warnings (as warnings.WarningMessage objects), which you can query for additional information:

```
with pytest.warns(RuntimeWarning) as record:
    warnings.warn("another warning", RuntimeWarning)

# check that only one warning was raised
assert len(record) == 1
# check that the message matches
assert record[0].message.args[0] == "another warning"
```

Alternatively, you can examine raised warnings in detail using the *recwarn* fixture (see below).

The recwarn fixture automatically ensures to reset the warnings filter at the end of the test, so no global state is leaked.

2.12.8 Recording warnings

You can record raised warnings either using pytest. warns () or with the recwarn fixture.

To record with <code>pytest.warns()</code> without asserting anything about the warnings, pass no arguments as the expected warning type and it will default to a generic Warning:

```
with pytest.warns() as record:
    warnings.warn("user", UserWarning)
    warnings.warn("runtime", RuntimeWarning)

assert len(record) == 2
assert str(record[0].message) == "user"
assert str(record[1].message) == "runtime"
```

The recwarn fixture will record warnings for the whole function:

```
import warnings

def test_hello(recwarn):
    warnings.warn("hello", UserWarning)
    assert len(recwarn) == 1
    w = recwarn.pop(UserWarning)
    assert issubclass(w.category, UserWarning)
    assert str(w.message) == "hello"
    assert w.filename
    assert w.lineno
```

Both recwarn and pytest. warns () return the same interface for recorded warnings: a WarningsRecorder instance. To view the recorded warnings, you can iterate over this instance, call len on it to get the number of recorded warnings, or index into it to get a particular recorded warning.

Full API: WarningsRecorder.

2.12.9 Additional use cases of warnings in tests

Here are some use cases involving warnings that often come up in tests, and suggestions on how to deal with them:

• To ensure that at least one of the indicated warnings is issued, use:

```
def test_warning():
    with pytest.warns((RuntimeWarning, UserWarning)):
    ...
```

• To ensure that only certain warnings are issued, use:

```
def test_warning(recwarn):
    ...
    assert len(recwarn) == 1
    user_warning = recwarn.pop(UserWarning)
    assert issubclass(user_warning.category, UserWarning)
```

• To ensure that **no** warnings are emitted, use:

```
def test_warning():
    with warnings.catch_warnings():
        warnings.simplefilter("error")
        ...
```

• To suppress warnings, use:

```
with warnings.catch_warnings():
    warnings.simplefilter("ignore")
    ...
```

2.12.10 Custom failure messages

Recording warnings provides an opportunity to produce custom test failure messages for when no warnings are issued or other conditions are met.

```
def test():
    with pytest.warns(Warning) as record:
        f()
        if not record:
            pytest.fail("Expected a warning!")
```

If no warnings are issued when calling f, then not record will evaluate to True. You can then call pytest. fail () with a custom error message.

2.12.11 Internal pytest warnings

pytest may generate its own warnings in some situations, such as improper usage or deprecated features.

For example, pytest will emit a warning if it encounters a class that matches python_classes but also defines an init constructor, as this prevents the class from being instantiated:

```
# content of test_pytest_warnings.py
class Test:
    def __init__(self):
        pass

    def test_foo(self):
        assert 1 == 1
```

These warnings might be filtered using the same builtin mechanisms used to filter other types of warnings.

Please read our *Backwards Compatibility Policy* to learn how we proceed about deprecating and eventually removing features.

The full list of warnings is listed in the reference documentation.

2.12.12 Resource Warnings

Additional information of the source of a ResourceWarning can be obtained when captured by pytest if trace-malloc module is enabled.

One convenient way to enable tracemalloc when running tests is to set the PYTHONTRACEMALLOC to a large enough number of frames (say 20, but that number is application dependent).

For more information, consult the Python Development Mode section in the Python documentation.

2.13 How to use skip and xfail to deal with tests that cannot succeed

You can mark test functions that cannot be run on certain platforms or that you expect to fail so pytest can deal with them accordingly and present a summary of the test session, while keeping the test suite *green*.

A **skip** means that you expect your test to pass only if some conditions are met, otherwise pytest should skip running the test altogether. Common examples are skipping windows-only tests on non-windows platforms, or skipping tests that depend on an external resource which is not available at the moment (for example a database).

An **xfail** means that you expect a test to fail for some reason. A common example is a test for a feature not yet implemented, or a bug not yet fixed. When a test passes despite being expected to fail (marked with pytest.mark.xfail), it's an **xpass** and will be reported in the test summary.

pytest counts and lists *skip* and *xfail* tests separately. Detailed information about skipped/xfailed tests is not shown by default to avoid cluttering the output. You can use the -r option to see details corresponding to the "short" letters shown in the test progress:

```
pytest -rxXs # show extra info on xfailed, xpassed, and skipped tests
```

More details on the -r option can be found by running pytest -h.

(See Builtin configuration file options)

2.13.1 Skipping test functions

The simplest way to skip a test function is to mark it with the skip decorator which may be passed an optional reason:

```
@pytest.mark.skip(reason="no way of currently testing this")
def test_the_unknown(): ...
```

Alternatively, it is also possible to skip imperatively during test execution or setup by calling the pytest. skip(reason) function:

```
def test_function():
    if not valid_config():
        pytest.skip("unsupported configuration")
```

The imperative method is useful when it is not possible to evaluate the skip condition during import time.

It is also possible to skip the whole module using pytest.skip(reason, allow_module_level=True) at the module level:

```
import sys
import pytest

if not sys.platform.startswith("win"):
    pytest.skip("skipping windows-only tests", allow_module_level=True)
```

Reference: pytest.mark.skip

skipif

If you wish to skip something conditionally then you can use skipif instead. Here is an example of marking a test function to be skipped when run on an interpreter earlier than Python3.10:

If the condition evaluates to True during collection, the test function will be skipped, with the specified reason appearing in the summary when using -rs.

You can share skipif markers between modules. Consider this test module:

```
# content of test_mymodule.py
import mymodule
minversion = pytest.mark.skipif(
    mymodule.__versioninfo__ < (1, 1), reason="at least mymodule-1.1 required"
)
@minversion
def test_function(): ...</pre>
```

You can import the marker and reuse it in another test module:

```
# test_myothermodule.py
from test_mymodule import minversion

@minversion
def test_anotherfunction(): ...
```

For larger test suites it's usually a good idea to have one file where you define the markers which you then consistently apply throughout your test suite.

Alternatively, you can use *condition strings* instead of booleans, but they can't be shared between modules easily so they are supported mainly for backward compatibility reasons.

Reference: pytest.mark.skipif

Skip all test functions of a class or module

You can use the skipif marker (as any other marker) on classes:

```
@pytest.mark.skipif(sys.platform == "win32", reason="does not run on windows")
class TestPosixCalls:
    def test_function(self):
        "will not be setup or run under 'win32' platform"
```

If the condition is True, this marker will produce a skip result for each of the test methods of that class.

If you want to skip all test functions of a module, you may use the pytestmark global:

```
# test_module.py
pytestmark = pytest.mark.skipif(...)
```

If multiple skipif decorators are applied to a test function, it will be skipped if any of the skip conditions is true.

Skipping files or directories

Sometimes you may need to skip an entire file or directory, for example if the tests rely on Python version-specific features or contain code that you do not wish pytest to run. In this case, you must exclude the files and directories from collection. Refer to *Customizing test collection* for more information.

Skipping on a missing import dependency

You can skip tests on a missing import by using *pytest.importorskip* at module level, within a test, or test setup function.

```
docutils = pytest.importorskip("docutils")
```

If docutils cannot be imported here, this will lead to a skip outcome of the test. You can also skip based on the version number of a library:

```
docutils = pytest.importorskip("docutils", minversion="0.3")
```

The version will be read from the specified module's version attribute.

Summary

Here's a quick guide on how to skip tests in a module in different situations:

1. Skip all tests in a module unconditionally:

```
pytestmark = pytest.mark.skip("all tests still WIP")
```

2. Skip all tests in a module based on some condition:

3. Skip all tests in a module if some import is missing:

```
pexpect = pytest.importorskip("pexpect")
```

2.13.2 XFail: mark test functions as expected to fail

You can use the xfail marker to indicate that you expect a test to fail:

```
@pytest.mark.xfail
def test_function(): ...
```

This test will run but no traceback will be reported when it fails. Instead, terminal reporting will list it in the "expected to fail" (XFAIL) or "unexpectedly passing" (XPASS) sections.

Alternatively, you can also mark a test as XFAIL from within the test or its setup function imperatively:

```
def test_function():
    if not valid_config():
        pytest.xfail("failing configuration (but should work)")
```

```
def test_function2():
    import slow_module

if slow_module.slow_function():
        pytest.xfail("slow_module taking too long")
```

These two examples illustrate situations where you don't want to check for a condition at the module level, which is when a condition would otherwise be evaluated for marks.

This will make test_function XFAIL. Note that no other code is executed after the <code>pytest.xfail()</code> call, differently from the marker. That's because it is implemented internally by raising a known exception.

Reference: pytest.mark.xfail

condition parameter

If a test is only expected to fail under a certain condition, you can pass that condition as the first parameter:

```
@pytest.mark.xfail(sys.platform == "win32", reason="bug in a 3rd party library")
def test_function(): ...
```

Note that you have to pass a reason as well (see the parameter description at *pytest.mark.xfail*).

reason parameter

You can specify the motive of an expected failure with the reason parameter:

```
@pytest.mark.xfail(reason="known parser issue")
def test_function(): ...
```

raises parameter

If you want to be more specific as to why the test is failing, you can specify a single exception, or a tuple of exceptions, in the raises argument.

```
@pytest.mark.xfail(raises=RuntimeError)
def test_function(): ...
```

Then the test will be reported as a regular failure if it fails with an exception not mentioned in raises.

run parameter

If a test should be marked as xfail and reported as such but should not be even executed, use the run parameter as False:

```
@pytest.mark.xfail(run=False)
def test_function(): ...
```

This is specially useful for xfailing tests that are crashing the interpreter and should be investigated later.

strict parameter

Both XFAIL and XPASS don't fail the test suite by default. You can change this by setting the strict keyword-only parameter to True:

```
@pytest.mark.xfail(strict=True)
def test_function(): ...
```

This will make XPASS ("unexpectedly passing") results from this test to fail the test suite.

You can change the default value of the strict parameter using the xfail_strict ini option:

```
[pytest]
xfail_strict=true
```

Ignoring xfail

By specifying on the commandline:

```
pytest --runxfail
```

you can force the running and reporting of an xfail marked test as if it weren't marked at all. This also causes pytest. xfail () to produce no effect.

Examples

Here is a simple test file with the several usages:

```
from __future__ import annotations
import pytest
xfail = pytest.mark.xfail
@xfail
def test_hello():
    assert 0
@xfail(run=False)
def test_hello2():
    assert 0
@xfail("hasattr(os, 'sep')")
def test_hello3():
    assert 0
@xfail(reason="bug 110")
def test_hello4():
    assert 0
@xfail('pytest.__version__[0] != "17"')
def test_hello5():
    assert 0
def test_hello6():
    pytest.xfail("reason")
@xfail(raises=IndexError)
```

```
def test_hello7():
    x = []
    x[1] = 1
```

Running it with the report-on-xfail option gives this output:

```
! pytest -rx xfail_demo.py
platform linux -- Python 3.x.y, pytest-6.x.y, py-1.x.y, pluggy-1.x.y
cachedir: $PYTHON_PREFIX/.pytest_cache
rootdir: $REGENDOC_TMPDIR/example
collected 7 items
xfail_demo.py xxxxxxx
                                                 [100%]
XFAIL xfail_demo.py::test_hello
XFAIL xfail_demo.py::test_hello2
 reason: [NOTRUN]
XFAIL xfail_demo.py::test_hello3
 condition: hasattr(os, 'sep')
XFAIL xfail_demo.py::test_hello4
 bug 110
XFAIL xfail_demo.py::test_hello5
 condition: pytest.__version__[0] != "17"
XFAIL xfail_demo.py::test_hello6
 reason: reason
XFAIL xfail_demo.py::test_hello7
```

2.13.3 Skip/xfail with parametrize

It is possible to apply markers like skip and xfail to individual test instances when using parametrize:

```
def test_increment(n, expected):
    assert n + 1 == expected
```

2.14 How to install and use plugins

This section talks about installing and using third party plugins. For writing your own plugins, please refer to *Writing plugins*.

Installing a third party plugin can be easily done with pip:

```
pip install pytest-NAME
pip uninstall pytest-NAME
```

If a plugin is installed, pytest automatically finds and integrates it, there is no need to activate it.

Here is a little annotated list for some popular plugins:

- pytest-django: write tests for django apps, using pytest integration.
- pytest-twisted: write tests for twisted apps, starting a reactor and processing deferreds from test functions.
- pytest-cov: coverage reporting, compatible with distributed testing
- pytest-xdist: to distribute tests to CPUs and remote hosts, to run in boxed mode which allows to survive segmentation faults, to run in looponfailing mode, automatically re-running failing tests on file changes.
- pytest-instafail: to report failures while the test run is happening.
- pytest-bdd: to write tests using behaviour-driven testing.
- pytest-timeout: to timeout tests based on function marks or global definitions.
- pytest-pep8: a --pep8 option to enable PEP8 compliance checking.
- pytest-flakes: check source code with pyflakes.
- allure-pytest: report test results via allure-framework.

To see a complete list of all plugins with their latest testing status against different pytest and Python versions, please visit *Pytest Plugin List*.

You may also discover more plugins through a pytest-pypi.org search.

2.14.1 Requiring/Loading plugins in a test module or conftest file

You can require plugins in a test module or a conftest file using pytest_plugins:

```
pytest_plugins = ("myapp.testsupport.myplugin",)
```

When the test module or conftest plugin is loaded the specified plugins will be loaded as well.



Requiring plugins using a pytest_plugins variable in non-root conftest.py files is deprecated. See *full explanation* in the Writing plugins section.



1 Note

The name pytest_plugins is reserved and should not be used as a name for a custom plugin module.

2.14.2 Finding out which plugins are active

If you want to find out which plugins are active in your environment you can type:

```
pytest --trace-config
```

and will get an extended test header which shows activated plugins and their names. It will also print local plugins aka conftest.py files when they are loaded.

2.14.3 Deactivating / unregistering a plugin by name

You can prevent plugins from loading or unregister them:

```
pytest -p no:NAME
```

This means that any subsequent try to activate/load the named plugin will not work.

If you want to unconditionally disable a plugin for a project, you can add this option to your pytest.ini file:

```
[pytest]
addopts = -p no:NAME
```

Alternatively to disable it only in certain environments (for example in a CI server), you can set PYTEST_ADDOPTS environment variable to -p no:name.

See Finding out which plugins are active for how to obtain the name of a plugin.

2.15 Writing plugins

It is easy to implement local conftest plugins for your own project or pip-installable plugins that can be used throughout many projects, including third party projects. Please refer to How to install and use plugins if you only want to use but not write plugins.

A plugin contains one or multiple hook functions. Writing hooks explains the basics and details of how you can write a hook function yourself. pytest implements all aspects of configuration, collection, running and reporting by calling well specified hooks of the following plugins:

- builtin plugins: loaded from pytest's internal _pytest directory.
- external plugins: installed third-party modules discovered through entry points in their packaging metadata
- conftest.py plugins: modules auto-discovered in test directories

In principle, each hook call is a 1:N Python function call where N is the number of registered implementation functions for a given specification. All specifications and implementations follow the pytest_prefix naming convention, making them easy to distinguish and find.

2.15.1 Plugin discovery order at tool startup

pytest loads plugin modules at tool startup in the following way:

- 1. by scanning the command line for the -p no: name option and *blocking* that plugin from being loaded (even builtin plugins can be blocked this way). This happens before normal command-line parsing.
- 2. by loading all builtin plugins.
- 3. by scanning the command line for the -p name option and loading the specified plugin. This happens before normal command-line parsing.
- 4. by loading all plugins registered through installed third-party package *entry points*, unless the *PYTEST_DIS-ABLE PLUGIN AUTOLOAD* environment variable is set.
- 5. by loading all plugins specified through the PYTEST_PLUGINS environment variable.
- 6. by loading all "initial "conftest.py files:
 - determine the test paths: specified on the command line, otherwise in testpaths if defined and running from the rootdir, otherwise the current dir
 - for each test path, load conftest.py and test*/conftest.py relative to the directory part of the test path, if exist. Before a conftest.py file is loaded, load conftest.py files in all of its parent directories. After a conftest.py file is loaded, recursively load all plugins specified in its pytest_plugins variable if present.

2.15.2 conftest.py: local per-directory plugins

Local conftest.py plugins contain directory-specific hook implementations. Hook Session and test running activities will invoke all hooks defined in conftest.py files closer to the root of the filesystem. Example of implementing the pytest_runtest_setup hook so that is called for tests in the a sub directory but not for other directories:

```
a/conftest.py:
    def pytest_runtest_setup(item):
        # called for running each test in 'a' directory
        print("setting up", item)

a/test_sub.py:
    def test_sub():
        pass

test_flat.py:
    def test_flat():
        pass
```

Here is how you might run it:

```
pytest test_flat.py --capture=no # will not show "setting up"
pytest a/test_sub.py --capture=no # will show "setting up"
```

1 Note

If you have conftest.py files which do not reside in a python package directory (i.e. one containing an __init__.py) then "import conftest" can be ambiguous because there might be other conftest.py files as well on your PYTHONPATH or sys.path. It is thus good practice for projects to either put conftest.py under a package scope or to never import anything from a conftest.py file.

See also: pytest import mechanisms and sys.path/PYTHONPATH.



Some hooks cannot be implemented in conftest.py files which are not *initial* due to how pytest discovers plugins during startup. See the documentation of each hook for details.

2.15.3 Writing your own plugin

If you want to write a plugin, there are many real-life examples you can copy from:

- a custom collection example plugin: A basic example for specifying tests in Yaml files
- builtin plugins which provide pytest's own functionality
- · many external plugins providing additional features

All of these plugins implement hooks and/or fixtures to extend and add functionality.

1 Note

Make sure to check out the excellent cookiecutter-pytest-plugin project, which is a cookiecutter template for authoring plugins.

The template provides an excellent starting point with a working plugin, tests running with tox, a comprehensive README file as well as a pre-configured entry-point.

Also consider contributing your plugin to pytest-dev once it has some happy users other than yourself.

2.15.4 Making your plugin installable by others

If you want to make your plugin externally available, you may define a so-called entry point for your distribution so that pytest finds your plugin module. Entry points are a feature that is provided by packaging tools.

pytest looks up the pytest11 entrypoint to discover its plugins, thus you can make your plugin available by defining it in your pyproject.toml file.

```
# sample ./pyproject.toml file
[build-system]
requires = ["hatchling"]
build-backend = "hatchling.build"

[project]
name = "myproject"
classifiers = [
    "Framework :: Pytest",
]

[project.entry-points.pytest11]
myproject = "myproject.pluginmodule"
```

If a package is installed this way, pytest will load myproject.pluginmodule as a plugin which can define hooks. Confirm registration with pytest --trace-config



Make sure to include Framework :: Pytest in your list of PyPI classifiers to make it easy for users to find your plugin.

2.15.5 Assertion Rewriting

One of the main features of pytest is the use of plain assert statements and the detailed introspection of expressions upon assertion failures. This is provided by "assertion rewriting" which modifies the parsed AST before it gets compiled to bytecode. This is done via a PEP 302 import hook which gets installed early on when pytest starts up and will perform this rewriting when modules get imported. However, since we do not want to test different bytecode from what you will run in production, this hook only rewrites test modules themselves (as defined by the python_files configuration option), and any modules which are part of plugins. Any other imported module will not be rewritten and normal assertion behaviour will happen.

If you have assertion helpers in other modules where you would need assertion rewriting to be enabled you need to ask pytest explicitly to rewrite this module before it gets imported.

```
register_assert_rewrite(*names)
```

Register one or more module names to be rewritten on import.

This function will make sure that this module or all modules inside the package will get their assert statements rewritten. Thus you should make sure to call this before the module is actually imported, usually in your __init__.py if you are a plugin using a package.

Parameters

names (str) – The module names to register.

This is especially important when you write a pytest plugin which is created using a package. The import hook only treats conftest.py files and any modules which are listed in the pytest11 entrypoint as plugins. As an example consider the following package:

```
pytest_foo/__init__.py
pytest_foo/plugin.py
pytest_foo/helper.py
```

With the following typical setup.py extract:

```
setup(..., entry_points={"pytest11": ["foo = pytest_foo.plugin"]}, ...)
```

In this case only pytest_foo/plugin.py will be rewritten. If the helper module also contains assert statements which need to be rewritten it needs to be marked as such, before it gets imported. This is easiest by marking it for rewriting inside the __init__.py module, which will always be imported first when a module inside a package is imported. This way plugin.py can still import helper.py normally. The contents of pytest_foo/__init__.py will then need to look like this:

```
import pytest

pytest.register_assert_rewrite("pytest_foo.helper")
```

2.15.6 Requiring/Loading plugins in a test module or conftest file

You can require plugins in a test module or a conftest.py file using pytest_plugins:

```
pytest_plugins = ["name1", "name2"]
```

When the test module or conftest plugin is loaded the specified plugins will be loaded as well. Any module can be blessed as a plugin, including internal application modules:

```
pytest_plugins = "myapp.testsupport.myplugin"
```

pytest_plugins are processed recursively, so note that in the example above if myapp.testsupport. myplugin also declares pytest plugins, the contents of the variable will also be loaded as plugins, and so on.

1 Note

Requiring plugins using pytest_plugins variable in non-root conftest.py files is deprecated.

This is important because conftest.py files implement per-directory hook implementations, but once a plugin is imported, it will affect the entire directory tree. In order to avoid confusion, defining <code>pytest_plugins</code> in any <code>conftest.py</code> file which is not located in the tests root directory is deprecated, and will raise a warning.

This mechanism makes it easy to share fixtures within applications or even external applications without the need to create external plugins using the entry point packaging metadata technique.

Plugins imported by <code>pytest_plugins</code> will also automatically be marked for assertion rewriting (see <code>pytest.register_assert_rewrite()</code>). However for this to have any effect the module must not be imported already; if it was already imported at the time the <code>pytest_plugins</code> statement is processed, a warning will result and assertions inside the plugin will not be rewritten. To fix this you can either call <code>pytest.register_assert_rewrite()</code> yourself before the module is imported, or you can arrange the code to delay the importing until after the plugin is registered.

2.15.7 Accessing another plugin by name

If a plugin wants to collaborate with code from another plugin it can obtain a reference through the plugin manager like this:

```
plugin = config.pluginmanager.get_plugin("name_of_plugin")
```

If you want to look at the names of existing plugins, use the --trace-config option.

2.15.8 Registering custom markers

If your plugin uses any markers, you should register them so that they appear in pytest's help text and do not *cause spurious warnings*. For example, the following plugin would register <code>cool_marker</code> and <code>mark_with</code> for all users:

```
def pytest_configure(config):
    config.addinivalue_line("markers", "cool_marker: this one is for cool tests.")
    config.addinivalue_line(
        "markers", "mark_with(arg, arg2): this marker takes arguments."
    )
```

2.15.9 Testing plugins

pytest comes with a plugin named pytester that helps you write tests for your plugin code. The plugin is disabled by default, so you will have to enable it before you can use it.

You can do so by adding the following line to a conftest.py file in your testing directory:

```
# content of conftest.py

pytest_plugins = ["pytester"]
```

Alternatively you can invoke pytest with the -p pytester command line option.

This will allow you to use the pytester fixture for testing your plugin code.

Let's demonstrate what you can do with the plugin with an example. Imagine we developed a plugin that provides a fixture hello which yields a function and we can invoke this function with one optional parameter. It will return a string value of Hello World! if we do not supply a value or Hello {value}! if we do supply a string value.

```
import pytest
def pytest_addoption(parser):
   group = parser.getgroup("helloworld")
    group.addoption(
       "--name",
       action="store",
        dest="name",
        default="World",
        help='Default "name" for hello().',
    )
@pytest.fixture
def hello(request):
   name = request.config.getoption("name")
    def _hello(name=None):
        if not name:
           name = request.config.getoption("name")
        return f"Hello {name}!"
    return _hello
```

Now the pytester fixture provides a convenient API for creating temporary conftest.py files and test files. It also allows us to run the tests and return a result object, with which we can assert the tests' outcomes.

```
"Floris",
    7)
    def name(request):
        return request.param
11 11 11
)
# create a temporary pytest test file
pytester.makepyfile(
    def test_hello_default(hello):
        assert hello() == "Hello World!"
    def test_hello_name(hello, name):
        assert hello(name) == "Hello {0}!".format(name)
11 11 11
)
# run all tests with pytest
result = pytester.runpytest()
# check that all 4 tests passed
result.assert_outcomes(passed=4)
```

Additionally it is possible to copy examples to the pytester's isolated environment before running pytest on it. This way we can abstract the tested logic to separate files, which is especially useful for longer tests and/or longer conftest.py files.

Note that for pytester.copy_example to work we need to set pytester_example_dir in our pytest. ini to tell pytest where to look for example files.

```
# content of pytest.ini
[pytest]
pytester_example_dir = .
```

```
# content of test_example.py

def test_plugin(pytester):
    pytester.copy_example("test_example.py")
    pytester.runpytest("-k", "test_example")

def test_example():
    pass
```

For more information about the result object that runpytest () returns, and the methods that it provides please check out the RunResult documentation.

2.16 Writing hook functions

2.16.1 hook function validation and execution

pytest calls hook functions from registered plugins for any given hook specification. Let's look at a typical hook function for the pytest_collection_modifyitems(session, config, items) hook which pytest calls after collection of all test items is completed.

When we implement a pytest_collection_modifyitems function in our plugin pytest will during registration verify that you use argument names which match the specification and bail out if not.

Let's look at a possible implementation:

```
def pytest_collection_modifyitems(config, items):
    # called after collection is completed
    # you can modify the ``items`` list
    ...
```

Here, pytest will pass in config (the pytest config object) and items (the list of collected test items) but will not pass in the session argument because we didn't list it in the function signature. This dynamic "pruning" of arguments allows pytest to be "future-compatible": we can introduce new hook named parameters without breaking the signatures of existing hook implementations. It is one of the reasons for the general long-lived compatibility of pytest plugins.

Note that hook functions other than pytest_runtest_* are not allowed to raise exceptions. Doing so will break the pytest run.

2.16.2 firstresult: stop at first non-None result

Most calls to pytest hooks result in a **list of results** which contains all non-None results of the called hook functions.

Some hook specifications use the firstresult=True option so that the hook call only executes until the first of N registered functions returns a non-None result which is then taken as result of the overall hook call. The remaining hook functions will not be called in this case.

2.16.3 hook wrappers: executing around other hooks

pytest plugins can implement hook wrappers which wrap the execution of other hook implementations. A hook wrapper is a generator function which yields exactly once. When pytest invokes hooks it first executes hook wrappers and passes the same arguments as to the regular hooks.

At the yield point of the hook wrapper pytest will execute the next hook implementations and return their result to the yield point, or will propagate an exception if they raised.

Here is an example definition of a hook wrapper:

```
do_something_before_next_hook_executes()

# If the outcome is an exception, will raise the exception.
res = yield

new_res = post_process_result(res)

# Override the return value to the plugin system.
return new_res
```

The hook wrapper needs to return a result for the hook, or raise an exception.

In many cases, the wrapper only needs to perform tracing or other side effects around the actual hook implementations, in which case it can return the result value of the yield. The simplest (though useless) hook wrapper is return (yield).

In other cases, the wrapper wants the adjust or adapt the result, in which case it can return a new value. If the result of the underlying hook is a mutable object, the wrapper may modify that result, but it's probably better to avoid it.

If the hook implementation failed with an exception, the wrapper can handle that exception using a try-catch-fi-nally around the yield, by propagating it, suppressing it, or raising a different exception entirely.

For more information, consult the pluggy documentation about hook wrappers.

2.16.4 Hook function ordering / call example

For any given hook specification there may be more than one implementation and we thus generally view hook execution as a 1:N function call where N is the number of registered functions. There are ways to influence if a hook implementation comes before or after others, i.e. the position in the N-sized list of functions:

```
# Plugin 1
@pytest.hookimpl(tryfirst=True)
def pytest_collection_modifyitems(items):
    # will execute as early as possible
# Plugin 2
@pytest.hookimpl(trylast=True)
def pytest_collection_modifyitems(items):
    # will execute as late as possible
# Plugin 3
@pytest.hookimpl(wrapper=True)
def pytest_collection_modifyitems(items):
    # will execute even before the tryfirst one above!
   try:
        return (yield)
    finally:
        # will execute after all non-wrappers executed
```

Here is the order of execution:

1. Plugin3's pytest_collection_modifyitems called until the yield point because it is a hook wrapper.

- 2. Plugin1's pytest collection modifyitems is called because it is marked with tryfirst=True.
- 3. Plugin2's pytest collection modifyitems is called because it is marked with trylast=True (but even without this mark it would come after Plugin1).
- 4. Plugin3's pytest_collection_modifyitems then executing the code after the yield point. The yield receives the result from calling the non-wrappers, or raises an exception if the non-wrappers raised.

It's possible to use tryfirst and trylast also on hook wrappers in which case it will influence the ordering of hook wrappers among each other.

2.16.5 Declaring new hooks



1 Note

This is a quick overview on how to add new hooks and how they work in general, but a more complete overview can be found in the pluggy documentation.

Plugins and conftest.py files may declare new hooks that can then be implemented by other plugins in order to alter behaviour or interact with the new plugin:

pytest_addhooks (pluginmanager)

Called at plugin registration time to allow adding new hooks via a call to pluginmanager. add_hookspecs(module_or_class, prefix).

Parameters

pluginmanager (PytestPluginManager) - The pytest plugin manager.



1 Note

This hook is incompatible with hook wrappers.

Use in conftest plugins

If a conftest plugin implements this hook, it will be called immediately when the conftest is registered.

Hooks are usually declared as do-nothing functions that contain only documentation describing when the hook will be called and what return values are expected. The names of the functions must start with pytest_ otherwise pytest won't recognize them.

Here's an example. Let's assume this code is in the sample hook.py module.

```
def pytest_my_hook(config):
    Receives the pytest config and does things with it
```

To register the hooks with pytest they need to be structured in their own module or class. This class or module can then be passed to the pluginmanager using the pytest_addhooks function (which itself is a hook exposed by pytest).

```
def pytest_addhooks(pluginmanager):
    """This example assumes the hooks are grouped in the 'sample_hook' module."""
    from my_app.tests import sample_hook
```

```
pluginmanager.add_hookspecs(sample_hook)
```

For a real world example, see newhooks.py from xdist.

Hooks may be called both from fixtures or from other hooks. In both cases, hooks are called through the hook object, available in the config object. Most hooks receive a config object directly, while fixtures may use the pytest-config fixture which provides the same object.

```
@pytest.fixture()
def my_fixture(pytestconfig):
    # call the hook called "pytest_my_hook"
    # 'result' will be a list of return values from all registered functions.
    result = pytestconfig.hook.pytest_my_hook(config=pytestconfig)
```

1 Note

Hooks receive parameters using only keyword arguments.

Now your hook is ready to be used. To register a function at the hook, other plugins or users must now simply define the function pytest_my_hook with the correct signature in their conftest.py.

Example:

```
def pytest_my_hook(config):
    """
    Print all active hooks to the screen.
    """
    print(config.hook)
```

2.16.6 Using hooks in pytest_addoption

Occasionally, it is necessary to change the way in which command line options are defined by one plugin based on hooks in another plugin. For example, a plugin may expose a command line option for which another plugin needs to define the default value. The pluginmanager can be used to install and use hooks to accomplish this. The plugin would define and add the hooks and use pytest_addoption as follows:

```
# contents of hooks.py

# Use firstresult=True because we only want one plugin to define this
# default value
@hookspec(firstresult=True)
def pytest_config_file_default_value():
    """Return the default value for the config file command line option."""

# contents of myplugin.py

def pytest_addhooks(pluginmanager):
    """This example assumes the hooks are grouped in the 'hooks' module."""
    from . import hooks
```

```
pluginmanager.add_hookspecs(hooks)

def pytest_addoption(parser, pluginmanager):
    default_value = pluginmanager.hook.pytest_config_file_default_value()
    parser.addoption(
        "--config-file",
        help="Config file to use, defaults to %(default)s",
        default=default_value,
    )
```

The conftest.py that is using myplugin would simply define the hook as follows:

```
def pytest_config_file_default_value():
    return "config.yaml"
```

2.16.7 Optionally using hooks from 3rd party plugins

Using new hooks from plugins as explained above might be a little tricky because of the standard *validation mechanism*: if you depend on a plugin that is not installed, validation will fail and the error message will not make much sense to your users.

One approach is to defer the hook implementation to a new plugin instead of declaring the hook functions directly in your plugin module, for example:

```
# contents of myplugin.py

class DeferPlugin:
    """Simple plugin to defer pytest-xdist hook functions."""

def pytest_testnodedown(self, node, error):
    """standard xdist hook function."""

def pytest_configure(config):
    if config.pluginmanager.hasplugin("xdist"):
        config.pluginmanager.register(DeferPlugin())
```

This has the added benefit of allowing you to conditionally install hooks depending on which plugins are installed.

2.16.8 Storing data on items across hook functions

Plugins often need to store data on *Items* in one hook implementation, and access it in another. One common solution is to just assign some private attribute directly on the item, but type-checkers like mypy frown upon this, and it may also cause conflicts with other plugins. So pytest offers a better way to do this, *item.stash*.

To use the "stash" in your plugins, first create "stash keys" somewhere at the top level of your plugin:

```
been_there_key = pytest.StashKey[bool]()
done_that_key = pytest.StashKey[str]()
```

then use the keys to stash your data at some point:

```
def pytest_runtest_setup(item: pytest.Item) -> None:
   item.stash[been_there_key] = True
   item.stash[done_that_key] = "no"
```

and retrieve them at another point:

```
def pytest_runtest_teardown(item: pytest.Item) -> None:
   if not item.stash[been_there_key]:
        print("Oh?")
   item.stash[done_that_key] = "yes!"
```

Stashes are available on all node types (like Class, Session) and also on Config, if needed.

2.17 How to use pytest with an existing test suite

Pytest can be used with most existing test suites, but its behavior differs from other test runners such as Python's default unittest framework.

Before using this section you will want to install pytest.

2.17.1 Running an existing test suite with pytest

Say you want to contribute to an existing repository somewhere. After pulling the code into your development space using some flavor of version control and (optionally) setting up a virtualenv you will want to run:

in your project root. This will set up a symlink to your code in site-packages, allowing you to edit your code while your tests run against it as if it were installed.

Setting up your project in development mode lets you avoid having to reinstall every time you want to run your tests, and is less brittle than mucking about with sys.path to point your tests at local code.

Also consider using tox.

2.18 How to use unittest-based tests with pytest

pytest supports running Python unittest-based tests out of the box. It's meant for leveraging existing unittest-based test suites to use pytest as a test runner and also allow to incrementally adapt the test suite to take full advantage of pytest's features.

To run an existing unittest-style test suite using pytest, type:

```
pytest tests
```

pytest will automatically collect unittest. TestCase subclasses and their test methods in test_*.py or *_test.py files.

Almost all unittest features are supported:

• @unittest.skip style decorators;

- setUp/tearDown;
- setUpClass/tearDownClass;
- setUpModule/tearDownModule;

Additionally, subtests are supported by the pytest-subtests plugin.

Up to this point pytest does not have support for the following features:

• load tests protocol;

2.18.1 Benefits out of the box

By running your test suite with pytest you can make use of several features, in most cases without having to modify existing code:

- Obtain more informative tracebacks;
- stdout and stderr capturing;
- Test selection options using -k and -m flags;
- maxfail;
- -pdb command-line option for debugging on test failures (see *note* below);
- Distribute tests to multiple CPUs using the pytest-xdist plugin;
- Use plain assert-statements instead of self.assert * functions (unittest2pytest is immensely helpful in this);

2.18.2 pytest features in unittest. TestCase subclasses

The following pytest features work in unittest. TestCase subclasses:

- *Marks*: *skip*, *skipif*, *xfail*;
- Auto-use fixtures;

The following pytest features **do not** work, and probably never will due to different design philosophies:

- Fixtures (except for autouse fixtures, see below);
- Parametrization;
- Custom hooks;

Third party plugins may or may not work well, depending on the plugin and the test suite.

2.18.3 Mixing pytest fixtures into unittest. TestCase subclasses using marks

Running your unittest with pytest allows you to use its *fixture mechanism* with unittest.TestCase style tests. Assuming you have at least skimmed the pytest fixture features, let's jump-start into an example that integrates a pytest db_class fixture, setting up a class-cached database object, and then reference it from a unittest-style test:

```
# content of conftest.py
# we define a fixture function below and it will be "used" by
# referencing its name from tests
(continuous provided)
```

(continues on next page)

```
import pytest

@pytest.fixture(scope="class")
def db_class(request):
    class DummyDB:
        pass

# set a class attribute on the invoking test context
    request.cls.db = DummyDB()
```

This defines a fixture function db_class which - if used - is called once for each test class and which sets the class-level db attribute to a DummyDB instance. The fixture function achieves this by receiving a special request object which gives access to the requesting test context such as the cls attribute, denoting the class from which the fixture is used. This architecture de-couples fixture writing from actual test code and allows reuse of the fixture by a minimal reference, the fixture name. So let's write an actual unittest. TestCase class using our fixture definition:

```
# content of test_unittest_db.py
import unittest
import pytest

@pytest.mark.usefixtures("db_class")
class MyTest (unittest.TestCase):
    def test_method1(self):
        assert hasattr(self, "db")
        assert 0, self.db # fail for demo purposes

def test_method2(self):
    assert 0, self.db # fail for demo purposes
```

The @pytest.mark.usefixtures("db_class") class-decorator makes sure that the pytest fixture function db_class is called once per class. Due to the deliberately failing assert statements, we can take a look at the self.db values in the traceback:

```
$ pytest test_unittest_db.py
platform linux -- Python 3.x.y, pytest-8.x.y, pluggy-1.x.y
rootdir: /home/sweet/project
collected 2 items
                                                    [100%]
test_unittest_db.py FF
_____ MyTest.test_method1 _
self = <test_unittest_db.MyTest testMethod=test_method1>
  def test_method1(self):
     assert hasattr(self, "db")
     assert 0, self.db # fail for demo purposes
Ε
     AssertionError: <conftest.db_class.<locals>.DummyDB object at 0xdeadbeef0001>
Ε
     assert 0
```

(continues on next page)

This default pytest traceback shows that the two test methods share the same self.db instance which was our intention when writing the class-scoped fixture function above.

2.18.4 Using autouse fixtures and accessing other fixtures

Although it's usually better to explicitly declare use of fixtures you need for a given test, you may sometimes want to have fixtures that are automatically used in a given context. After all, the traditional style of unittest-setup mandates the use of this implicit fixture writing and chances are, you are used to it or like it.

You can flag fixture functions with <code>@pytest.fixture</code> (autouse=True) and define the fixture function in the context where you want it used. Let's look at an <code>initdir</code> fixture which makes all test methods of a <code>TestCase</code> class execute in a temporary directory with a pre-initialized <code>samplefile.ini</code>. Our <code>initdir</code> fixture itself uses the pytest builtin <code>tmp_path</code> fixture to delegate the creation of a per-test temporary directory:

```
# content of test_unittest_cleandir.py
import unittest

import pytest

class MyTest (unittest.TestCase):
    @pytest.fixture(autouse=True)
    def initdir(self, tmp_path, monkeypatch):
        monkeypatch.chdir(tmp_path) # change to pytest-provided temporary directory
        tmp_path.joinpath("samplefile.ini").write_text("# testdata", encoding="utf-8")

def test_method(self):
    with open("samplefile.ini", encoding="utf-8") as f:
        s = f.read()
    assert "testdata" in s
```

Due to the autouse flag the initdir fixture function will be used for all methods of the class where it is defined. This is a shortcut for using a <code>@pytest.mark.usefixtures("initdir")</code> marker on the class like in the previous example.

Running this test module ...:

```
$ pytest -q test_unittest_cleandir.py
.
[100%]
1 passed in 0.12s
```

... gives us one passed test because the initdir fixture function was executed ahead of the test_method.



unittest. TestCase methods cannot directly receive fixture arguments as implementing that is likely to inflict on the ability to run general unittest. TestCase test suites.

The above usefixtures and autouse examples should help to mix in pytest fixtures into unittest suites.

You can also gradually move away from subclassing from unittest. TestCase to *plain asserts* and then start to benefit from the full pytest feature set step by step.

1 Note

Due to architectural differences between the two frameworks, setup and teardown for unittest-based tests is performed during the call phase of testing instead of in pytest's standard setup and teardown stages. This can be important to understand in some situations, particularly when reasoning about errors. For example, if a unittest-based suite exhibits errors during setup, pytest will report no errors during its setup phase and will instead raise the error during call.

2.19 How to implement xunit-style set-up

This section describes a classic and popular way how you can implement fixtures (setup and teardown test state) on a per-module/class/function basis.



While these setup/teardown methods are simple and familiar to those coming from a unittest or nose background, you may also consider using pytest's more powerful *fixture mechanism* which leverages the concept of dependency injection, allowing for a more modular and more scalable approach for managing test state, especially for larger projects and for functional testing. You can mix both fixture mechanisms in the same file but test methods of unittest. TestCase subclasses cannot receive fixture arguments.

2.19.1 Module level setup/teardown

If you have multiple test functions and test classes in a single module you can optionally implement the following fixture methods which will usually be called once for all the functions:

```
def setup_module(module):
    """setup any state specific to the execution of the given module."""

def teardown_module(module):
    """teardown any state that was previously setup with a setup_module
    method.
    """"
```

As of pytest-3.0, the module parameter is optional.

2.19.2 Class level setup/teardown

Similarly, the following methods are called at class level before and after all test methods of the class are called:

```
@classmethod
def setup_class(cls):
    """setup any state specific to the execution of the given class (which
    usually contains tests).
    """

@classmethod
def teardown_class(cls):
    """teardown any state that was previously setup with a call to
    setup_class.
    """
```

2.19.3 Method and function level setup/teardown

Similarly, the following methods are called around each method invocation:

```
def setup_method(self, method):
    """setup any state tied to the execution of the given method in a
    class. setup_method is invoked for every test method of a class.
    """

def teardown_method(self, method):
    """teardown any state that was previously setup with a setup_method
    call.
    """
```

As of pytest-3.0, the method parameter is optional.

If you would rather define test functions directly at module level you can also use the following functions to implement fixtures:

```
def setup_function(function):
    """setup any state tied to the execution of the given function.
    Invoked for every test function in the module.
    """

def teardown_function(function):
    """teardown any state that was previously setup with a setup_function call.
    """
```

As of pytest-3.0, the function parameter is optional.

Remarks:

- It is possible for setup/teardown pairs to be invoked multiple times per testing process.
- teardown functions are not called if the corresponding setup function existed and failed/was skipped.
- Prior to pytest-4.2, xunit-style functions did not obey the scope rules of fixtures, so it was possible, for example, for a setup_method to be called before a session-scoped autouse fixture.

Now the xunit-style functions are integrated with the fixture mechanism and obey the proper scope rules of fixtures involved in the call.

2.20 How to set up bash completion

When using bash as your shell, pytest can use argcomplete (https://kislyuk.github.io/argcomplete/) for auto-completion. For this argcomplete needs to be installed **and** enabled.

Install argcomplete using:

```
sudo pip install 'argcomplete>=0.5.7'
```

For global activation of all argcomplete enabled python applications run:

```
sudo activate-global-python-argcomplete
```

For permanent (but not global) pytest activation, use:

```
register-python-argcomplete pytest >> ~/.bashrc
```

For one-time activation of argcomplete for pytest only, use:

```
eval "$(register-python-argcomplete pytest)"
```

CHAPTER

THREE

REFERENCE GUIDES

3.1 Fixtures reference



About fixtures

See also

How to use fixtures

3.1.1 Built-in fixtures

Fixtures are defined using the @pytest.fixture decorator. Pytest has several useful built-in fixtures:

capfd

Capture, as text, output to file descriptors 1 and 2.

capfdbinary

Capture, as bytes, output to file descriptors 1 and 2.

caplog

Control logging and access log entries.

capsys

Capture, as text, output to sys.stdout and sys.stderr.

capsysbinary

Capture, as bytes, output to sys.stdout and sys.stderr.

cache

Store and retrieve values across pytest runs.

doctest_namespace

Provide a dict injected into the doctests namespace.

monkeypatch

Temporarily modify classes, functions, dictionaries, os.environ, and other objects.

pytestconfig

Access to configuration values, pluginmanager and plugin hooks.

```
record property
```

Add extra properties to the test.

record_testsuite_property

Add extra properties to the test suite.

recwarn

Record warnings emitted by test functions.

request

Provide information on the executing test function.

testdir

Provide a temporary test directory to aid in running, and testing, pytest plugins.

tmp path

Provide a pathlib. Path object to a temporary directory which is unique to each test function.

tmp path factory

Make session-scoped temporary directories and return pathlib.Path objects.

tmpdir

Provide a py.path.local object to a temporary directory which is unique to each test function; replaced by tmp_path.

tmpdir factory

Make session-scoped temporary directories and return py.path.local objects; replaced by tmp_path_factory.

3.1.2 Fixture availability

Fixture availability is determined from the perspective of the test. A fixture is only available for tests to request if they are in the scope that fixture is defined in. If a fixture is defined inside a class, it can only be requested by tests inside that class. But if a fixture is defined inside the global scope of the module, then every test in that module, even if it's defined inside a class, can request it.

Similarly, a test can also only be affected by an autouse fixture if that test is in the same scope that autouse fixture is defined in (see *Autouse fixtures are executed first within their scope*).

A fixture can also request any other fixture, no matter where it's defined, so long as the test requesting them can see all fixtures involved.

For example, here's a test file with a fixture (outer) that requests a fixture (inner) from a scope it wasn't defined in:

```
from __future__ import annotations
import pytest

@pytest.fixture
def order():
    return []

@pytest.fixture
def outer(order, inner):
    order.append("outer")
```

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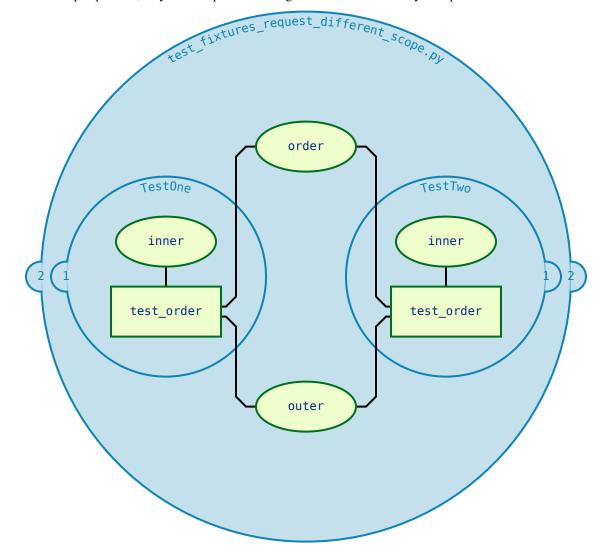
```
class TestOne:
    @pytest.fixture
    def inner(self, order):
        order.append("one")

    def test_order(self, order, outer):
        assert order == ["one", "outer"]

class TestTwo:
    @pytest.fixture
    def inner(self, order):
        order.append("two")

    def test_order(self, order, outer):
        assert order == ["two", "outer"]
```

From the tests' perspectives, they have no problem seeing each of the fixtures they're dependent on:



So when they run, outer will have no problem finding inner, because pytest searched from the tests' perspectives.



The scope a fixture is defined in has no bearing on the order it will be instantiated in: the order is mandated by the logic described *here*.

conftest.py: sharing fixtures across multiple files

The conftest.py file serves as a means of providing fixtures for an entire directory. Fixtures defined in a conftest.py can be used by any test in that package without needing to import them (pytest will automatically discover them).

You can have multiple nested directories/packages containing your tests, and each directory can have its own conftest. py with its own fixtures, adding on to the ones provided by the conftest.py files in parent directories.

For example, given a test file structure like this:

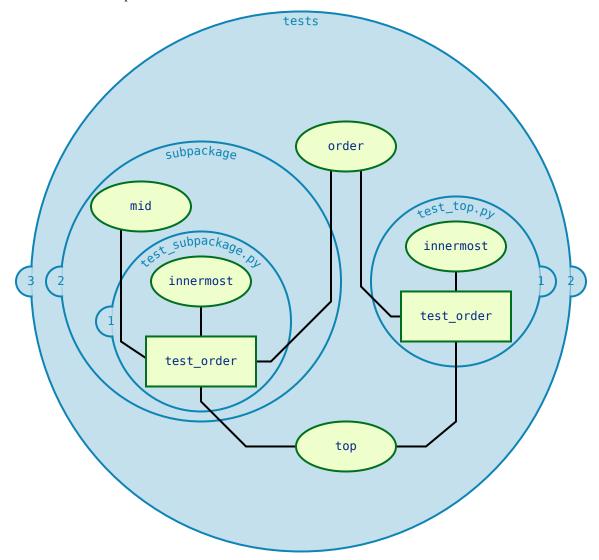
```
tests/
   __init__.py
    conftest.py
        # content of tests/conftest.py
        import pytest
        @pytest.fixture
        def order():
            return []
        @pytest.fixture
        def top(order, innermost):
            order.append("top")
    test_top.py
        # content of tests/test_top.py
        import pytest
        @pytest.fixture
        def innermost(order):
            order.append("innermost top")
        def test_order(order, top):
            assert order == ["innermost top", "top"]
    subpackage/
        __init__.py
        conftest.py
            # content of tests/subpackage/conftest.py
            import pytest
            @pytest.fixture
            def mid(order):
                order.append("mid subpackage")
        test_subpackage.py
            # content of tests/subpackage/test_subpackage.py
            import pytest
```

(continues on next page)

```
@pytest.fixture
def innermost(order, mid):
    order.append("innermost subpackage")

def test_order(order, top):
    assert order == ["mid subpackage", "innermost subpackage", "top"]
```

The boundaries of the scopes can be visualized like this:



The directories become their own sort of scope where fixtures that are defined in a conftest.py file in that directory become available for that whole scope.

Tests are allowed to search upward (stepping outside a circle) for fixtures, but can never go down (stepping inside a circle) to continue their search. So tests/subpackage/test_subpackage.py::test_order would be able to find the innermost fixture defined in tests/subpackage/test_subpackage.py, but the one defined in tests/test_top.py would be unavailable to it because it would have to step down a level (step inside a circle) to find it.

The first fixture the test finds is the one that will be used, so *fixtures can be overridden* if you need to change or extend what one does for a particular scope.

You can also use the conftest.py file to implement local per-directory plugins.

Fixtures from third-party plugins

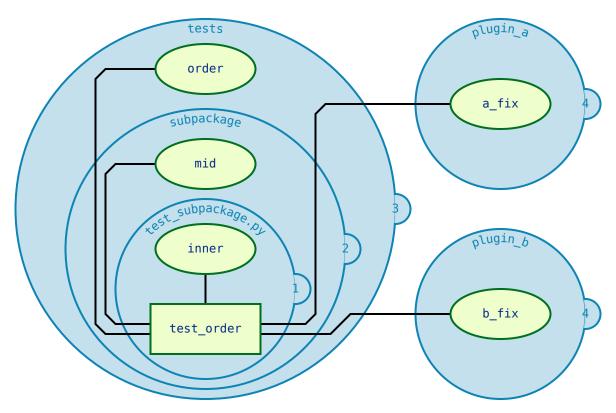
Fixtures don't have to be defined in this structure to be available for tests, though. They can also be provided by third-party plugins that are installed, and this is how many pytest plugins operate. As long as those plugins are installed, the fixtures they provide can be requested from anywhere in your test suite.

Because they're provided from outside the structure of your test suite, third-party plugins don't really provide a scope like conftest.py files and the directories in your test suite do. As a result, pytest will search for fixtures stepping out through scopes as explained previously, only reaching fixtures defined in plugins *last*.

For example, given the following file structure:

```
tests/
     _init__.py
   conftest.py
        # content of tests/conftest.py
        import pytest
        @pytest.fixture
        def order():
           return []
    subpackage/
       __init__.py
        conftest.py
            # content of tests/subpackage/conftest.py
            import pytest
            @pytest.fixture(autouse=True)
            def mid(order, b_fix):
                order.append("mid subpackage")
        test_subpackage.py
            # content of tests/subpackage/test_subpackage.py
            import pytest
            @pytest.fixture
            def inner(order, mid, a_fix):
                order.append("inner subpackage")
            def test_order(order, inner):
                assert order == ["b_fix", "mid subpackage", "a_fix", "inner subpackage"
" ]
```

If plugin_a is installed and provides the fixture a_fix, and plugin_b is installed and provides the fixture b_fix, then this is what the test's search for fixtures would look like:



pytest will only search for a_fix and b_fix in the plugins after searching for them first in the scopes inside tests/.

3.1.3 Fixture instantiation order

When pytest wants to execute a test, once it knows what fixtures will be executed, it has to figure out the order they'll be executed in. To do this, it considers 3 factors:

- 1. scope
- 2. dependencies
- 3. autouse

Names of fixtures or tests, where they're defined, the order they're defined in, and the order fixtures are requested in have no bearing on execution order beyond coincidence. While pytest will try to make sure coincidences like these stay consistent from run to run, it's not something that should be depended on. If you want to control the order, it's safest to rely on these 3 things and make sure dependencies are clearly established.

Higher-scoped fixtures are executed first

Within a function request for fixtures, those of higher-scopes (such as session) are executed before lower-scoped fixtures (such as function or class).

Here's an example:

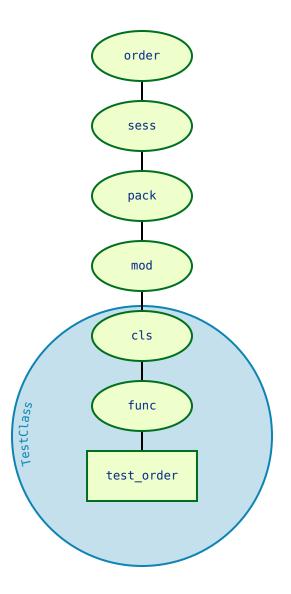
```
from __future__ import annotations
import pytest

(continues on next page)
```

```
@pytest.fixture(scope="session")
def order():
    return []
@pytest.fixture
def func(order):
    order.append("function")
@pytest.fixture(scope="class")
def cls(order):
   order.append("class")
@pytest.fixture(scope="module")
def mod(order):
    order.append("module")
@pytest.fixture(scope="package")
def pack(order):
    order.append("package")
@pytest.fixture(scope="session")
def sess(order):
    order.append("session")
class TestClass:
    def test_order(self, func, cls, mod, pack, sess, order):
        assert order == ["session", "package", "module", "class", "function"]
```

The test will pass because the larger scoped fixtures are executing first.

The order breaks down to this:



Fixtures of the same order execute based on dependencies

When a fixture requests another fixture, the other fixture is executed first. So if fixture a requests fixture b, fixture b will execute first, because a depends on b and can't operate without it. Even if a doesn't need the result of b, it can still request b if it needs to make sure it is executed after b.

For example:

```
from __future__ import annotations
import pytest

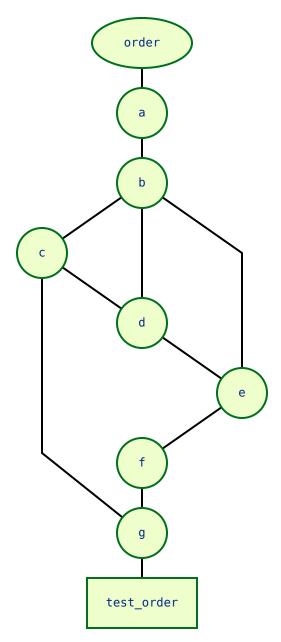
@pytest.fixture
def order():
    return []

@pytest.fixture

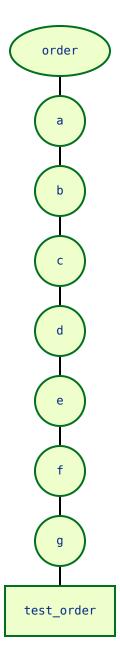
(continues on next page)
```

```
def a(order):
   order.append("a")
@pytest.fixture
def b(a, order):
   order.append("b")
@pytest.fixture
def c(b, order):
   order.append("c")
@pytest.fixture
def d(c, b, order):
   order.append("d")
@pytest.fixture
def e(d, b, order):
   order.append("e")
@pytest.fixture
def f(e, order):
   order.append("f")
@pytest.fixture
def g(f, c, order):
   order.append("g")
def test_order(g, order):
   assert order == ["a", "b", "c", "d", "e", "f", "g"]
```

If we map out what depends on what, we get something that looks like this:

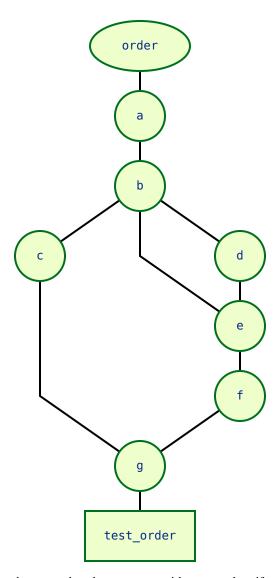


The rules provided by each fixture (as to what fixture(s) each one has to come after) are comprehensive enough that it can be flattened to this:



Enough information has to be provided through these requests in order for pytest to be able to figure out a clear, linear chain of dependencies, and as a result, an order of operations for a given test. If there's any ambiguity, and the order of operations can be interpreted more than one way, you should assume pytest could go with any one of those interpretations at any point.

For example, if d didn't request c, i.e.the graph would look like this:



Because nothing requested c other than g, and g also requests f, it's now unclear if c should go before/after f, e, or d. The only rules that were set for c is that it must execute after b and before g.

pytest doesn't know where c should go in the case, so it should be assumed that it could go anywhere between g and b.

This isn't necessarily bad, but it's something to keep in mind. If the order they execute in could affect the behavior a test is targeting, or could otherwise influence the result of a test, then the order should be defined explicitly in a way that allows pytest to linearize/"flatten" that order.

Autouse fixtures are executed first within their scope

Autouse fixtures are assumed to apply to every test that could reference them, so they are executed before other fixtures in that scope. Fixtures that are requested by autouse fixtures effectively become autouse fixtures themselves for the tests that the real autouse fixture applies to.

So if fixture a is autouse and fixture b is not, but fixture a requests fixture b, then fixture b will effectively be an autouse fixture as well, but only for the tests that a applies to.

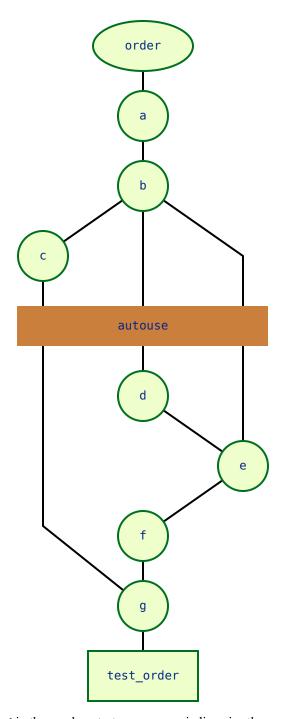
In the last example, the graph became unclear if d didn't request c. But if c was autouse, then b and a would effectively also be autouse because c depends on them. As a result, they would all be shifted above non-autouse fixtures within that

scope.

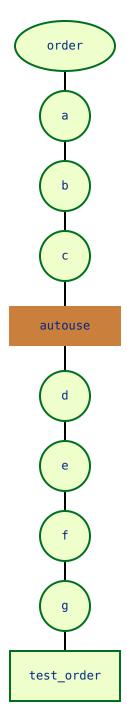
So if the test file looked like this:

```
from __future__ import annotations
import pytest
@pytest.fixture
def order():
   return []
@pytest.fixture
def a(order):
    order.append("a")
@pytest.fixture
def b(a, order):
   order.append("b")
@pytest.fixture(autouse=True)
def c(b, order):
    order.append("c")
@pytest.fixture
def d(b, order):
   order.append("d")
@pytest.fixture
def e(d, order):
    order.append("e")
@pytest.fixture
def f(e, order):
    order.append("f")
@pytest.fixture
def g(f, c, order):
   order.append("g")
def test_order_and_g(g, order):
    assert order == ["a", "b", "c", "d", "e", "f", "g"]
```

the graph would look like this:



Because $\ c$ can now be put above $\ d$ in the graph, pytest can once again linearize the graph to this:

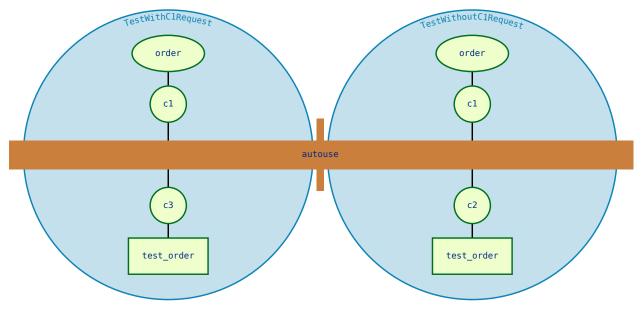


In this example, c makes b and a effectively autouse fixtures as well.

Be careful with autouse, though, as an autouse fixture will automatically execute for every test that can reach it, even if they don't request it. For example, consider this file:

```
def order():
    return []
@pytest.fixture(scope="class", autouse=True)
def c1(order):
   order.append("c1")
@pytest.fixture(scope="class")
def c2(order):
   order.append("c2")
@pytest.fixture(scope="class")
def c3(order, c1):
   order.append("c3")
class TestClassWithC1Request:
    def test_order(self, order, c1, c3):
        assert order == ["c1", "c3"]
class TestClassWithoutC1Request:
    def test_order(self, order, c2):
        assert order == ["c1", "c2"]
```

Even though nothing in TestClassWithoutClRequest is requesting c1, it still is executed for the tests inside it anyway:

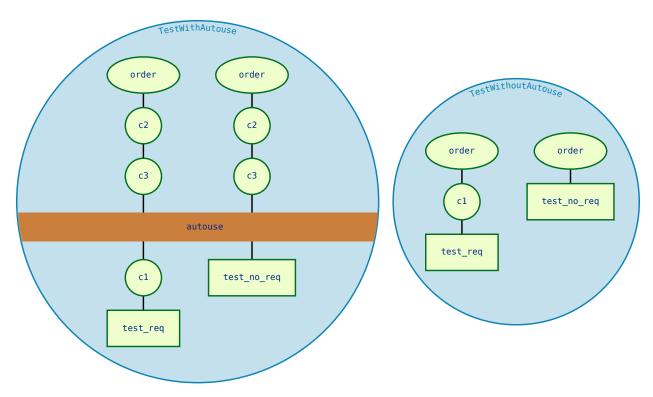


But just because one autouse fixture requested a non-autouse fixture, that doesn't mean the non-autouse fixture becomes an autouse fixture for all contexts that it can apply to. It only effectively becomes an autouse fixture for the contexts the real autouse fixture (the one that requested the non-autouse fixture) can apply to.

For example, take a look at this test file:

```
from __future__ import annotations
import pytest
@pytest.fixture
def order():
   return []
@pytest.fixture
def c1(order):
   order.append("c1")
@pytest.fixture
def c2(order):
   order.append("c2")
class TestClassWithAutouse:
    @pytest.fixture(autouse=True)
   def c3(self, order, c2):
        order.append("c3")
   def test_req(self, order, c1):
        assert order == ["c2", "c3", "c1"]
   def test_no_req(self, order):
        assert order == ["c2", "c3"]
class TestClassWithoutAutouse:
   def test_req(self, order, c1):
        assert order == ["c1"]
   def test_no_req(self, order):
        assert order == []
```

It would break down to something like this:



For test_req and test_no_req inside TestClassWithAutouse, c3 effectively makes c2 an autouse fixture, which is why c2 and c3 are executed for both tests, despite not being requested, and why c2 and c3 are executed before c1 for test_req.

If this made c2 an *actual* autouse fixture, then c2 would also execute for the tests inside TestClassWithoutAutouse, since they can reference c2 if they wanted to. But it doesn't, because from the perspective of the TestClassWithoutAutouse tests, c2 isn't an autouse fixture, since they can't see c3.

3.2 Pytest Plugin List

Below is an automated compilation of pytest` plugins available on PyPI. It includes PyPI projects whose names begin with pytest— or pytest— and a handful of manually selected projects. Packages classified as inactive are excluded.

For detailed insights into how this list is generated, please refer to the update script.

A Warning

Please be aware that this list is not a curated collection of projects and does not undergo a systematic review process. It serves purely as an informational resource to aid in the discovery of pytest plugins.

Do not presume any endorsement from the pytest project or its developers, and always conduct your own quality assessment before incorporating any of these plugins into your own projects.

This list contains 1512 plugins.

logassert

last release: May 20, 2022, status: 5 - Production/Stable, requires: N/A

Simple but powerful assertion and verification of logged lines.

```
logot
      last release: Mar 23, 2024, status: 5 - Production/Stable, requires: pytest<9,>=7; extra == "pytest"
      Test whether your code is logging correctly [?]
nuts
      last release: Jul 19, 2024, status: N/A, requires: pytest<8,>=7
      Network Unit Testing System
pytest-abq
      last release: Apr 07, 2023, status: N/A, requires: N/A
      Pytest integration for the ABQ universal test runner.
pytest-abstracts
      last release: May 25, 2022, status: N/A, requires: N/A
      A contextmanager pytest fixture for handling multiple mock abstracts
pytest-accept
      last release: Feb 10, 2024, status: N/A, requires: pytest (>=6)
      A pytest-plugin for updating doctest outputs
pytest-adaptavist
      last release: Oct 13, 2022, status: N/A, requires: pytest (>=5.4.0)
      pytest plugin for generating test execution results within Jira Test Management (tm4j)
pytest-adaptavist-fixed
      last release: Nov 08, 2023, status: N/A, requires: pytest >=5.4.0
      pytest plugin for generating test execution results within Jira Test Management (tm4j)
pytest-addons-test
      last release: Aug 02, 2021, status: N/A, requires: pytest (>=6.2.4,<7.0.0)
      用于测试pytest的插件
pytest-adf
      last release: May 10, 2021, status: 4 - Beta, requires: pytest (>=3.5.0)
      Pytest plugin for writing Azure Data Factory integration tests
pytest-adf-azure-identity
      last release: Mar 06, 2021, status: 4 - Beta, requires: pytest (>=3.5.0)
      Pytest plugin for writing Azure Data Factory integration tests
pytest-ads-testplan
      last release: Sep 15, 2022, status: N/A, requires: N/A
      Azure DevOps Test Case reporting for pytest tests
pytest-affected
      last release: Nov 06, 2023, status: N/A, requires: N/A
pytest-agent
      last release: Nov 25, 2021, status: N/A, requires: N/A
      Service that exposes a REST API that can be used to interract remotely with Pytest. It is shipped with a dashboard
      that enables running tests in a more convenient way.
```

pytest-aggreport

last release: Mar 07, 2021, status: 4 - Beta, requires: pytest (>=6.2.2)

```
pytest plugin for pytest-repeat that generate aggregate report of the same test cases with additional statistics details.
pytest-ai1899
      last release: Mar 13, 2024, status: 5 - Production/Stable, requires: N/A
      pytest plugin for connecting to ai1899 smart system stack
pytest-aio
      last release: Jul 31, 2024, status: 5 - Production/Stable, requires: pytest
      Pytest plugin for testing async python code
pytest-aiofiles
      last release: May 14, 2017, status: 5 - Production/Stable, requires: N/A
      pytest fixtures for writing aiofiles tests with pyfakefs
pytest-aiogram
      last release: May 06, 2023, status: N/A, requires: N/A
pytest-aiohttp
      last release: Sep 06, 2023, status: 4 - Beta, requires: pytest >=6.1.0
      Pytest plugin for aiohttp support
pytest-aiohttp-client
      last release: Jan 10, 2023, status: N/A, requires: pytest (>=7.2.0,<8.0.0)
      Pytest 'client' fixture for the Aiohttp
pytest-aiomoto
      last release: Jun 24, 2023, status: N/A, requires: pytest (>=7.0,<8.0)
      pytest-aiomoto
pytest-aioresponses
      last release: Jul 29, 2021, status: 4 - Beta, requires: pytest (>=3.5.0)
      py.test integration for aioresponses
pytest-aioworkers
      last release: May 01, 2023, status: 5 - Production/Stable, requires: pytest>=6.1.0
      A plugin to test aioworkers project with pytest
pytest-airflow
      last release: Apr 03, 2019, status: 3 - Alpha, requires: pytest (>=4.4.0)
      pytest support for airflow.
pytest-airflow-utils
      last release: Nov 15, 2021, status: N/A, requires: N/A
pytest-alembic
      last release: Jul 29, 2024, status: N/A, requires: pytest>=6.0
      A pytest plugin for verifying alembic migrations.
pytest-allclose
      last release: Jul 30, 2019, status: 5 - Production/Stable, requires: pytest
      Pytest fixture extending Numpy's allclose function
pytest-allure-adaptor
      last release: Jan 10, 2018, status: N/A, requires: pytest (>=2.7.3)
```

Plugin for py.test to generate allure xml reports

pytest-allure-adaptor2

last release: Oct 14, 2020, status: N/A, requires: pytest (>=2.7.3)

Plugin for py.test to generate allure xml reports

pytest-allure-collection

last release: Apr 13, 2023, status: N/A, requires: pytest

pytest plugin to collect allure markers without running any tests

pytest-allure-dsl

last release: Oct 25, 2020, status: 4 - Beta, requires: pytest

pytest plugin to test case doc string dls instructions

pytest-allure-id2history

last release: May 14, 2024, status: 4 - Beta, requires: pytest>=6.2.0

Overwrite allure history id with testcase full name and testcase id if testcase has id, exclude parameters.

pytest-allure-intersection

last release: Oct 27, 2022, status: N/A, requires: pytest (<5)

pytest-allure-spec-coverage

last release: Oct 26, 2021, status: N/A, requires: pytest

The pytest plugin aimed to display test coverage of the specs(requirements) in Allure

pytest-alphamoon

last release: Dec 30, 2021, status: 5 - Production/Stable, requires: pytest (>=3.5.0)

Static code checks used at Alphamoon

pytest-analyzer

last release: Feb 21, 2024, status: N/A, requires: pytest <8.0.0,>=7.3.1

this plugin allows to analyze tests in pytest project, collect test metadata and sync it with testomat.io TCM system

pytest-android

last release: Feb 21, 2019, status: 3 - Alpha, requires: pytest

This fixture provides a configured "driver" for Android Automated Testing, using uiautomator2.

pytest-anki

last release: Jul 31, 2022, status: 4 - Beta, requires: pytest (>=3.5.0)

A pytest plugin for testing Anki add-ons

pytest-annotate

last release: Jun 07, 2022, status: 3 - Alpha, requires: pytest (<8.0.0,>=3.2.0)

pytest-annotate: Generate PyAnnotate annotations from your pytest tests.

pytest-ansible

last release: Aug 16, 2024, status: 5 - Production/Stable, requires: pytest>=6

Plugin for pytest to simplify calling ansible modules from tests or fixtures

pytest-ansible-playbook

last release: Mar 08, 2019, status: 4 - Beta, requires: N/A

Pytest fixture which runs given ansible playbook file.

pytest-ansible-playbook-runner

last release: Dec 02, 2020, status: 4 - Beta, requires: pytest (>=3.1.0)

Pytest fixture which runs given ansible playbook file.

pytest-ansible-units last release: Apr 14, 20 A pytest plugin for run pytest-antilru last release: Jul 28, 20 Bust functools.lru_cacl pytest-anyio last release: Jun 29, 20 The pytest anyio plugin pytest-anything last release: Jan 18, 20 Pytest fixtures to asser pytest-aoc last release: Dec 02, 20 Downloads puzzle inpu

last release: Apr 14, 2022, status: N/A, requires: N/A

A pytest plugin for running unit tests within an ansible collection

last release: Jul 28, 2024, status: 5 - Production/Stable, requires: pytest>=7; python_version >= "3.10"

Bust functools.lru_cache when running pytest to avoid test pollution

last release: Jun 29, 2021, status: N/A, requires: pytest

The pytest anyio plugin is built into anyio. You don't need this package.

last release: Jan 18, 2024, status: N/A, requires: pytest

Pytest fixtures to assert anything and something

last release: Dec 02, 2023, status: 5 - Production/Stable, requires: pytest; extra == 'test'

Downloads puzzle inputs for Advent of Code and synthesizes PyTest fixtures

pytest-aoreporter

last release: Jun 27, 2022, status: N/A, requires: N/A

pytest report

pytest-api

last release: May 12, 2022, *status*: N/A, *requires*: pytest (>=7.1.1,<8.0.0)

An ASGI middleware to populate OpenAPI Specification examples from pytest functions

pytest-api-soup

last release: Aug 27, 2022, status: N/A, requires: N/A

Validate multiple endpoints with unit testing using a single source of truth.

pytest-apistellar

last release: Jun 18, 2019, status: N/A, requires: N/A

apistellar plugin for pytest.

pytest-apiver

last release: Jun 21, 2024, status: N/A, requires: pytest

pytest-appengine

last release: Feb 27, 2017, status: N/A, requires: N/A

AppEngine integration that works well with pytest-django

pytest-appium

last release: Dec 05, 2019, status: N/A, requires: N/A

Pytest plugin for appium

pytest-approvaltests

last release: May 08, 2022, status: 4 - Beta, requires: pytest (>=7.0.1)

A plugin to use approvaltests with pytest

pytest-approvaltests-geo

last release: Feb 05, 2024, status: 5 - Production/Stable, requires: pytest

Extension for ApprovalTests.Python specific to geo data verification

```
pytest-archon
      last release: Dec 18, 2023, status: 5 - Production/Stable, requires: pytest >=7.2
      Rule your architecture like a real developer
pytest-argus
      last release: Jun 24, 2021, status: 5 - Production/Stable, requires: pytest (>=6.2.4)
      pyest results colection plugin
pytest-arraydiff
      last release: Nov 27, 2023, status: 4 - Beta, requires: pytest >=4.6
      pytest plugin to help with comparing array output from tests
pytest-asgi-server
      last release: Dec 12, 2020, status: N/A, requires: pytest (>=5.4.1)
      Convenient ASGI client/server fixtures for Pytest
pytest-aspec
      last release: Dec 20, 2023, status: 4 - Beta, requires: N/A
      A rspec format reporter for pytest
pytest-asptest
      last release: Apr 28, 2018, status: 4 - Beta, requires: N/A
      test Answer Set Programming programs
pytest-assertcount
      last release: Oct 23, 2022, status: N/A, requires: pytest (>=5.0.0)
      Plugin to count actual number of asserts in pytest
pytest-assertions
      last release: Apr 27, 2022, status: N/A, requires: N/A
      Pytest Assertions
pytest-assertutil
      last release: May 10, 2019, status: N/A, requires: N/A
      pytest-assertutil
pytest-assert-utils
      last release: Apr 14, 2022, status: 3 - Alpha, requires: N/A
      Useful assertion utilities for use with pytest
pytest-assist
      last release: Jun 24, 2024, status: N/A, requires: pytest
      load testing library
pytest-assume
      last release: Jun 24, 2021, status: N/A, requires: pytest (>=2.7)
      A pytest plugin that allows multiple failures per test
pytest-assurka
      last release: Aug 04, 2022, status: N/A, requires: N/A
      A pytest plugin for Assurka Studio
```

```
pytest-ast-back-to-python
      last release: Sep 29, 2019, status: 4 - Beta, requires: N/A
      A plugin for pytest devs to view how assertion rewriting recodes the AST
pytest-asteroid
      last release: Aug 15, 2022, status: N/A, requires: pytest (>=6.2.5,<8.0.0)
      PyTest plugin for docker-based testing on database images
pytest-astropy
      last release: Sep 26, 2023, status: 5 - Production/Stable, requires: pytest >=4.6
      Meta-package containing dependencies for testing
pytest-astropy-header
      last release: Sep 06, 2022, status: 3 - Alpha, requires: pytest (>=4.6)
      pytest plugin to add diagnostic information to the header of the test output
pytest-ast-transformer
      last release: May 04, 2019, status: 3 - Alpha, requires: pytest
pytest_async
      last release: Feb 26, 2020, status: N/A, requires: N/A
      pytest-async - Run your coroutine in event loop without decorator
pytest-async-generators
      last release: Jul 05, 2023, status: N/A, requires: N/A
      Pytest fixtures for async generators
pytest-asyncio
      last release: Aug 22, 2024, status: 4 - Beta, requires: pytest<9,>=8.2
      Pytest support for asyncio
pytest-asyncio-cooperative
      last release: Jul 04, 2024, status: N/A, requires: N/A
      Run all your asynchronous tests cooperatively.
pytest-asyncio-network-simulator
      last release: Jul 31, 2018, status: 3 - Alpha, requires: pytest (<3.7.0,>=3.3.2)
      pytest-asyncio-network-simulator: Plugin for pytest for simulator the network in tests
pytest-async-mongodb
      last release: Oct 18, 2017, status: 5 - Production/Stable, requires: pytest (>=2.5.2)
      pytest plugin for async MongoDB
pytest-async-sqlalchemy
      last release: Oct 07, 2021, status: 4 - Beta, requires: pytest (>=6.0.0)
      Database testing fixtures using the SQLAlchemy asyncio API
pytest-atf-allure
      last release: Nov 29, 2023, status: N/A, requires: pytest (>=7.4.2,<8.0.0)
      基于allure-pytest进行自定义
pytest-atomic
      last release: Nov 24, 2018, status: 4 - Beta, requires: N/A
      Skip rest of tests if previous test failed.
```

```
pytest-attrib
      last release: May 24, 2016, status: 4 - Beta, requires: N/A
      pytest plugin to select tests based on attributes similar to the nose-attrib plugin
pytest-attributes
      last release: Jun 24, 2024, status: 4 - Beta, requires: pytest>=6.2.0
      A plugin that allows users to add attributes to their tests. These attributes can then be referenced by fixtures or the
      test itself.
pytest-austin
      last release: Oct 11, 2020, status: 4 - Beta, requires: N/A
      Austin plugin for pytest
pytest-autocap
      last release: May 15, 2022, status: N/A, requires: pytest (<7.2,>=7.1.2)
      automatically capture test & fixture stdout/stderr to files
pytest-autochecklog
      last release: Apr 25, 2015, status: 4 - Beta, requires: N/A
      automatically check condition and log all the checks
pytest-autofixture
      last release: Aug 01, 2024, status: N/A, requires: pytest>=8
      simplify pytest fixtures
pytest-automation
      last release: Apr 24, 2024, status: N/A, requires: pytest>=7.0.0
      pytest plugin for building a test suite, using YAML files to extend pytest parameterize functionality.
pytest-automock
      last release: May 16, 2023, status: N/A, requires: pytest; extra == 'dev'
      Pytest plugin for automatical mocks creation
pytest-auto-parametrize
      last release: Oct 02, 2016, status: 3 - Alpha, requires: N/A
      pytest plugin: avoid repeating arguments in parametrize
pytest-autotest
      last release: Aug 25, 2021, status: N/A, requires: pytest
      This fixture provides a configured "driver" for Android Automated Testing, using uiautomator2.
pytest-aux
      last release: Aug 06, 2024, status: N/A, requires: N/A
      templates/examples and aux for pytest
pytest-aviator
      last release: Nov 04, 2022, status: 4 - Beta, requires: pytest
```

pytest-avoidance

last release: May 23, 2019, status: 4 - Beta, requires: pytest (>=3.5.0)

Aviator's Flakybot pytest plugin that automatically reruns flaky tests.

Makes pytest skip tests that don not need rerunning

pytest-aws

last release: Oct 04, 2017, status: 4 - Beta, requires: N/A

pytest plugin for testing AWS resource configurations

pytest-aws-apigateway

last release: May 24, 2024, status: 4 - Beta, requires: pytest

pytest plugin for AWS ApiGateway

pytest-aws-config

last release: May 28, 2021, status: N/A, requires: N/A

Protect your AWS credentials in unit tests

pytest-aws-fixtures

last release: Jul 30, 2024, status: N/A, requires: pytest<9.0.0,>=8.0.0

A series of fixtures to use in integration tests involving actual AWS services.

pytest-axe

last release: Nov 12, 2018, status: N/A, requires: pytest (>=3.0.0)

pytest plugin for axe-selenium-python

pytest-axe-playwright-snapshot

last release: Jul 25, 2023, status: N/A, requires: pytest

A pytest plugin that runs Axe-core on Playwright pages and takes snapshots of the results.

pytest-azure

last release: Jan 18, 2023, status: 3 - Alpha, requires: pytest

Pytest utilities and mocks for Azure

pytest-azure-devops

last release: Jun 20, 2022, status: 4 - Beta, requires: pytest (>=3.5.0)

Simplifies using azure devops parallel strategy (https://docs.microsoft.com/en-us/azure/devops/pipelines/test/parallel-testing-any-test-runner) with pytest.

pytest-azurepipelines

last release: Oct 06, 2023, status: 5 - Production/Stable, requires: pytest (>=5.0.0)

Formatting PyTest output for Azure Pipelines UI

pytest-bandit

last release: Feb 23, 2021, status: 4 - Beta, requires: pytest (>=3.5.0)

A bandit plugin for pytest

pytest-bandit-xayon

last release: Oct 17, 2022, status: 4 - Beta, requires: pytest (>=3.5.0)

A bandit plugin for pytest

pytest-base-url

last release: Jan 31, 2024, status: 5 - Production/Stable, requires: pytest>=7.0.0

pytest plugin for URL based testing

pytest-batch-regression

last release: May 08, 2024, status: N/A, requires: pytest>=6.0.0

A pytest plugin to repeat the entire test suite in batches.

```
pvtest-bazel
      last release: Jul 20, 2024, status: 4 - Beta, requires: pytest
      A pytest runner with bazel support
pytest-bdd
      last release: Jun 04, 2024, status: 6 - Mature, requires: pytest>=6.2.0
      BDD for pytest
pytest-bdd-html
      last release: Nov 22, 2022, status: 3 - Alpha, requires: pytest (!=6.0.0,>=5.0)
      pytest plugin to display BDD info in HTML test report
pytest-bdd-ng
      last release: Dec 31, 2023, status: 4 - Beta, requires: pytest >=5.0
      BDD for pytest
pytest-bdd-report
      last release: Aug 26, 2024, status: N/A, requires: pytest>=7.1.3
      A pytest-bdd plugin for generating useful and informative BDD test reports
pytest-bdd-splinter
      last release: Aug 12, 2019, status: 5 - Production/Stable, requires: pytest (>=4.0.0)
      Common steps for pytest bdd and splinter integration
pytest-bdd-web
      last release: Jan 02, 2020, status: 4 - Beta, requires: pytest (>=3.5.0)
      A simple plugin to use with pytest
pytest-bdd-wrappers
      last release: Feb 11, 2020, status: 2 - Pre-Alpha, requires: N/A
pytest-beakerlib
      last release: Mar 17, 2017, status: 5 - Production/Stable, requires: pytest
      A pytest plugin that reports test results to the BeakerLib framework
pytest-beartype
      last release: Aug 08, 2024, status: N/A, requires: pytest
      Pytest plugin to run your tests with beartype checking enabled.
pytest-bec-e2e
      last release: Aug 30, 2024, status: 3 - Alpha, requires: pytest
      BEC pytest plugin for end-to-end tests
pytest-beds
      last release: Jun 07, 2016, status: 4 - Beta, requires: N/A
      Fixtures for testing Google Appengine (GAE) apps
pytest-beeprint
      last release: Jul 04, 2023, status: 4 - Beta, requires: N/A
      use icdiff for better error messages in pytest assertions
pytest-bench
      last release: Jul 21, 2014, status: 3 - Alpha, requires: N/A
```

Benchmark utility that plugs into pytest.

pytest-benchmark

last release: Oct 25, 2022, status: 5 - Production/Stable, requires: pytest (>=3.8)

A "pytest" fixture for benchmarking code. It will group the tests into rounds that are calibrated to the chosen timer.

pytest-better-datadir

last release: Mar 13, 2023, status: N/A, requires: N/A

A small example package

pytest-better-parametrize

last release: Mar 05, 2024, status: 4 - Beta, requires: pytest >=6.2.0

Better description of parametrized test cases

pytest-bg-process

last release: Jan 24, 2022, status: 4 - Beta, requires: pytest (>=3.5.0)

Pytest plugin to initialize background process

pytest-bigchaindb

last release: Jan 24, 2022, status: 4 - Beta, requires: N/A

A BigchainDB plugin for pytest.

pytest-bigquery-mock

last release: Dec 28, 2022, status: N/A, requires: pytest (>=5.0)

Provides a mock fixture for python bigquery client

pytest-bisect-tests

last release: Jun 09, 2024, status: N/A, requires: N/A

Find tests leaking state and affecting other

pytest-black

last release: Oct 05, 2020, status: 4 - Beta, requires: N/A

A pytest plugin to enable format checking with black

pytest-black-multipy

last release: Jan 14, 2021, status: 5 - Production/Stable, requires: pytest (!=3.7.3,>=3.5); extra == 'testing'

Allow '-black' on older Pythons

pytest-black-ng

last release: Oct 20, 2022, status: 4 - Beta, requires: pytest (>=7.0.0)

A pytest plugin to enable format checking with black

pytest-blame

last release: May 04, 2019, status: N/A, requires: pytest (>=4.4.0)

A pytest plugin helps developers to debug by providing useful commits history.

pytest-blender

last release: Aug 02, 2024, status: N/A, requires: pytest

Blender Pytest plugin.

pytest-blink1

last release: Jan 07, 2018, status: 4 - Beta, requires: N/A

Pytest plugin to emit notifications via the Blink(1) RGB LED

pytest-blockage

last release: Dec 21, 2021, status: N/A, requires: pytest

Disable network requests during a test run.

pytest-blocker

last release: Sep 07, 2015, status: 4 - Beta, requires: N/A

pytest plugin to mark a test as blocker and skip all other tests

pytest-blue

last release: Sep 05, 2022, status: N/A, requires: N/A

A pytest plugin that adds a 'blue' fixture for printing stuff in blue.

pytest-board

last release: Jan 20, 2019, status: N/A, requires: N/A

Local continuous test runner with pytest and watchdog.

pytest-boost-xml

last release: Nov 30, 2022, status: 4 - Beta, requires: N/A

Plugin for pytest to generate boost xml reports

pytest-bootstrap

last release: Mar 04, 2022, status: N/A, requires: N/A

pytest-boto-mock

last release: Jul 16, 2024, status: 5 - Production/Stable, requires: pytest>=8.2.0

Thin-wrapper around the mock package for easier use with pytest

pytest-bpdb

last release: Jan 19, 2015, status: 2 - Pre-Alpha, requires: N/A

A py.test plug-in to enable drop to bpdb debugger on test failure.

pytest-bq

last release: May 08, 2024, status: 5 - Production/Stable, requires: pytest>=6.2

BigQuery fixtures and fixture factories for Pytest.

pytest-bravado

last release: Feb 15, 2022, status: N/A, requires: N/A

Pytest-bravado automatically generates from OpenAPI specification client fixtures.

pytest-breakword

last release: Aug 04, 2021, status: N/A, requires: pytest (>=6.2.4,<7.0.0)

Use breakword with pytest

pytest-breed-adapter

last release: Nov 07, 2018, status: 4 - Beta, requires: pytest (>=3.5.0)

A simple plugin to connect with breed-server

pytest-briefcase

last release: Jun 14, 2020, status: 4 - Beta, requires: pytest (>=3.5.0)

A pytest plugin for running tests on a Briefcase project.

pytest-broadcaster

last release: Apr 06, 2024, status: 3 - Alpha, requires: pytest

Pytest plugin to broadcast pytest output to various destinations

pytest-browser

last release: Dec 10, 2016, status: 3 - Alpha, requires: N/A

A pytest plugin for console based browser test selection just after the collection phase

pytest-browsermob-proxy

last release: Jun 11, 2013, status: 4 - Beta, requires: N/A

BrowserMob proxy plugin for py.test.

pytest browserstack

last release: Jan 27, 2016, status: 4 - Beta, requires: N/A

Py.test plugin for BrowserStack

pytest-browserstack-local

last release: Feb 09, 2018, status: N/A, requires: N/A

"py.test" plugin to run "BrowserStackLocal" in background.

pytest-budosystems

last release: May 07, 2023, status: 3 - Alpha, requires: pytest

Budo Systems is a martial arts school management system. This module is the Budo Systems Pytest Plugin.

pytest-bug

last release: Jun 05, 2024, status: 5 - Production/Stable, requires: pytest>=8.0.0

Pytest plugin for marking tests as a bug

pytest-bugtong-tag

last release: Jan 16, 2022, status: N/A, requires: N/A

pytest-bugtong-tag is a plugin for pytest

pytest-bugzilla

last release: May 05, 2010, status: 4 - Beta, requires: N/A

py.test bugzilla integration plugin

pytest-bugzilla-notifier

last release: Jun 15, 2018, status: 4 - Beta, requires: pytest (>=2.9.2)

A plugin that allows you to execute create, update, and read information from BugZilla bugs

pytest-buildkite

last release: Jul 13, 2019, status: 4 - Beta, requires: pytest (>=3.5.0)

Plugin for pytest that automatically publishes coverage and pytest report annotations to Buildkite.

pytest-builtin-types

last release: Nov 17, 2021, status: N/A, requires: pytest

pytest-bwrap

last release: Feb 25, 2024, status: 3 - Alpha, requires: N/A

Run your tests in Bubblewrap sandboxes

pytest-cache

last release: Jun 04, 2013, status: 3 - Alpha, requires: N/A

pytest plugin with mechanisms for caching across test runs

pytest-cache-assert

last release: Aug 14, 2023, status: 5 - Production/Stable, requires: pytest (>=6.0.0)

Cache assertion data to simplify regression testing of complex serializable data

pytest-cagoule

last release: Jan 01, 2020, status: 3 - Alpha, requires: N/A

Pytest plugin to only run tests affected by changes

pytest-cairo

last release: Apr 17, 2022, status: N/A, requires: pytest

Pytest support for cairo-lang and starknet

pytest-call-checker

last release: Oct 16, 2022, status: 4 - Beta, requires: pytest (>=7.1.3,<8.0.0)

Small pytest utility to easily create test doubles

pytest-camel-collect

last release: Aug 02, 2020, status: N/A, requires: pytest (>=2.9)

Enable CamelCase-aware pytest class collection

pytest-canonical-data

last release: May 08, 2020, status: 2 - Pre-Alpha, requires: pytest (>=3.5.0)

A plugin which allows to compare results with canonical results, based on previous runs

pytest-caprng

last release: May 02, 2018, status: 4 - Beta, requires: N/A

A plugin that replays pRNG state on failure.

pytest-capture-deprecatedwarnings

last release: Apr 30, 2019, status: N/A, requires: N/A

pytest plugin to capture all deprecatedwarnings and put them in one file

pytest-capture-warnings

last release: May 03, 2022, status: N/A, requires: pytest

pytest plugin to capture all warnings and put them in one file of your choice

pytest-cases

last release: Apr 04, 2024, status: 5 - Production/Stable, requires: N/A

Separate test code from test cases in pytest.

pytest-cassandra

last release: Nov 04, 2017, status: 1 - Planning, requires: N/A

Cassandra CCM Test Fixtures for pytest

pytest-catchlog

last release: Jan 24, 2016, status: 4 - Beta, requires: pytest (>=2.6)

py.test plugin to catch log messages. This is a fork of pytest-capturelog.

pytest-catch-server

last release: Dec 12, 2019, status: 5 - Production/Stable, requires: N/A

Pytest plugin with server for catching HTTP requests.

pytest-celery

last release: Aug 12, 2024, status: 4 - Beta, requires: N/A

Pytest plugin for Celery

```
pytest-cfg-fetcher
      last release: Feb 26, 2024, status: N/A, requires: N/A
      Pass config options to your unit tests.
pytest-chainmaker
      last release: Oct 15, 2021, status: N/A, requires: N/A
      pytest plugin for chainmaker
pytest-chalice
      last release: Jul 01, 2020, status: 4 - Beta, requires: N/A
      A set of py.test fixtures for AWS Chalice
pytest-change-assert
      last release: Oct 19, 2022, status: N/A, requires: N/A
      修改报错中文为英文
pytest-change-demo
      last release: Mar 02, 2022, status: N/A, requires: pytest
      turn . into \sqrt{\ }, turn F into x
pytest-change-report
      last release: Sep 14, 2020, status: N/A, requires: pytest
      turn . into \sqrt{\ }, turn F into x
pytest-change-xds
      last release: Apr 16, 2022, status: N/A, requires: pytest
      turn . into \sqrt{\ }, turn F into x
pytest-chdir
      last release: Jan 28, 2020, status: N/A, requires: pytest (>=5.0.0,<6.0.0)
      A pytest fixture for changing current working directory
pytest-check
      last release: Aug 28, 2024, status: 5 - Production/Stable, requires: pytest>=7.0.0
      A pytest plugin that allows multiple failures per test.
pytest-checkdocs
      last release: Apr 30, 2024, status: 5 - Production/Stable, requires: pytest!=8.1.*,>=6; extra == "testing"
      check the README when running tests
pytest-checkipdb
      last release: Dec 04, 2023, status: 5 - Production/Stable, requires: pytest >=2.9.2
      plugin to check if there are ipdb debugs left
pytest-check-library
      last release: Jul 17, 2022, status: N/A, requires: N/A
      check your missing library
pytest-check-libs
      last release: Jul 17, 2022, status: N/A, requires: N/A
      check your missing library
```

```
pytest-check-links
```

last release: Jul 29, 2020, status: N/A, requires: pytest<9,>=7.0

Check links in files

pytest-checklist

last release: Jun 10, 2024, status: N/A, requires: N/A

Pytest plugin to track and report unit/function coverage.

pytest-check-mk

last release: Nov 19, 2015, status: 4 - Beta, requires: pytest

pytest plugin to test Check_MK checks

pytest-check-requirements

last release: Feb 20, 2024, status: N/A, requires: N/A

A package to prevent Dependency Confusion attacks against Yandex.

pytest-ch-framework

last release: Apr 17, 2024, status: N/A, requires: pytest==8.0.1

My pytest framework

pytest-chic-report

last release: Jan 31, 2023, status: 5 - Production/Stable, requires: N/A

A pytest plugin to send a report and printing summary of tests.

pytest-choose

last release: Feb 04, 2024, status: N/A, requires: pytest >=7.0.0

Provide the pytest with the ability to collect use cases based on rules in text files

pytest-chunks

last release: Jul 05, 2022, status: N/A, requires: pytest (>=6.0.0)

Run only a chunk of your test suite

pytest_cid

last release: Sep 01, 2023, status: 4 - Beta, requires: pytest >= 5.0, < 7.0

Compare data structures containing matching CIDs of different versions and encoding

pytest-circleci

last release: May 03, 2019, status: N/A, requires: N/A

py.test plugin for CircleCI

pytest-circleci-parallelized

last release: Oct 20, 2022, status: N/A, requires: N/A

Parallelize pytest across CircleCI workers.

pytest-circleci-parallelized-rjp

last release: Jun 21, 2022, status: N/A, requires: pytest

Parallelize pytest across CircleCI workers.

pytest-ckan

last release: Apr 28, 2020, status: 4 - Beta, requires: pytest

Backport of CKAN 2.9 pytest plugin and fixtures to CAKN 2.8

pytest-clarity last release: Jun 11, 2021, status: N/A, requires: N/A A plugin providing an alternative, colourful diff output for failing assertions. pytest-cldf last release: Nov 07, 2022, status: N/A, requires: pytest (>=3.6) Easy quality control for CLDF datasets using pytest pytest-cleanslate last release: Jun 17, 2024, status: N/A, requires: pytest Collects and executes pytest tests separately pytest_cleanup last release: Jan 28, 2020, status: N/A, requires: N/A Automated, comprehensive and well-organised pytest test cases. pytest-cleanuptotal last release: Aug 26, 2024, status: 5 - Production/Stable, requires: N/A A cleanup plugin for pytest pytest-clerk last release: Aug 15, 2024, status: N/A, requires: pytest<9.0.0,>=8.0.0 A set of pytest fixtures to help with integration testing with Clerk. pytest-click last release: Feb 11, 2022, status: 5 - Production/Stable, requires: pytest (>=5.0) Pytest plugin for Click pytest-cli-fixtures last release: Jul 28, 2022, status: N/A, requires: pytest (~=7.0) Automatically register fixtures for custom CLI arguments pytest-clld last release: Jul 06, 2022, status: N/A, requires: pytest (>=3.6) pytest-cloud last release: Oct 05, 2020, status: 6 - Mature, requires: N/A Distributed tests planner plugin for pytest testing framework. pytest-cloudflare-worker last release: Mar 30, 2021, status: 4 - Beta, requires: pytest (>=6.0.0) pytest plugin for testing cloudflare workers pytest-cloudist last release: Sep 02, 2022, status: 4 - Beta, requires: pytest (>=7.1.2,<8.0.0) Distribute tests to cloud machines without fuss pytest-cmake last release: Aug 16, 2024, status: N/A, requires: pytest<9,>=4 Provide CMake module for Pytest

last release: Dec 26, 2022, status: N/A, requires: pytest (>=7.2.0,<8.0.0)

3.2. Pytest Plugin List

Execute CMake Presets via pytest

pytest-cmake-presets

pytest-cmdline-add-args

last release: Aug 31, 2024, status: N/A, requires: N/A

Pytest plugin for custom argument handling and Allure reporting. This plugin allows you to add arguments before running a test.

pytest-cobra

last release: Jun 29, 2019, *status*: 3 - Alpha, *requires*: pytest (<4.0.0,>=3.7.1)

PyTest plugin for testing Smart Contracts for Ethereum blockchain.

pytest_codeblocks

last release: Sep 17, 2023, status: 5 - Production/Stable, requires: pytest >= 7.0.0

Test code blocks in your READMEs

pytest-codecarbon

last release: Jun 15, 2022, status: N/A, requires: pytest

Pytest plugin for measuring carbon emissions

pytest-codecheckers

last release: Feb 13, 2010, status: N/A, requires: N/A

pytest plugin to add source code sanity checks (pep8 and friends)

pytest-codecov

last release: Aug 21, 2024, status: 4 - Beta, requires: pytest>=4.6.0

Pytest plugin for uploading pytest-cov results to codecov.io

pytest-codegen

last release: Aug 23, 2020, status: 2 - Pre-Alpha, requires: N/A

Automatically create pytest test signatures

pytest-codeowners

last release: Mar 30, 2022, status: 4 - Beta, requires: pytest (>=6.0.0)

Pytest plugin for selecting tests by GitHub CODEOWNERS.

pytest-codestyle

last release: Mar 23, 2020, status: 3 - Alpha, requires: N/A

pytest plugin to run pycodestyle

pytest-codspeed

last release: Mar 19, 2024, status: 5 - Production/Stable, requires: pytest>=3.8

Pytest plugin to create CodSpeed benchmarks

pytest-collect-appoint-info

last release: Aug 03, 2023, status: N/A, requires: pytest

set your encoding

pytest-collect-formatter

last release: Mar 29, 2021, status: 5 - Production/Stable, requires: N/A

Formatter for pytest collect output

pytest-collect-formatter2

last release: May 31, 2021, status: 5 - Production/Stable, requires: N/A

Formatter for pytest collect output

pytest-collect-interface-info-plugin

last release: Sep 25, 2023, status: 4 - Beta, requires: N/A

Get executed interface information in pytest interface automation framework

pytest-collector

last release: Aug 02, 2022, status: N/A, requires: pytest (>=7.0,<8.0)

Python package for collecting pytest.

pytest-collect-pytest-interinfo

last release: Sep 26, 2023, status: 4 - Beta, requires: N/A

A simple plugin to use with pytest

pytest-colordots

last release: Oct 06, 2017, status: 5 - Production/Stable, requires: N/A

Colorizes the progress indicators

pytest-commander

last release: Aug 17, 2021, status: N/A, requires: pytest (<7.0.0,>=6.2.4)

An interactive GUI test runner for PyTest

pytest-common-subject

last release: Jun 12, 2024, status: N/A, requires: pytest<9,>=3.6

pytest framework for testing different aspects of a common method

pytest-compare

last release: Jun 22, 2023, status: 5 - Production/Stable, requires: N/A

pytest plugin for comparing call arguments.

pytest-concurrent

last release: Jan 12, 2019, status: 4 - Beta, requires: pytest (>=3.1.1)

Concurrently execute test cases with multithread, multiprocess and gevent

pytest-config

last release: Nov 07, 2014, status: 5 - Production/Stable, requires: N/A

Base configurations and utilities for developing your Python project test suite with pytest.

pytest-confluence-report

last release: Apr 17, 2022, status: N/A, requires: N/A

Package stands for pytest plugin to upload results into Confluence page.

pytest-console-scripts

last release: May 31, 2023, status: 4 - Beta, requires: pytest (>=4.0.0)

Pytest plugin for testing console scripts

pytest-consul

last release: Nov 24, 2018, status: 3 - Alpha, requires: pytest

pytest plugin with fixtures for testing consul aware apps

pytest-container

last release: Apr 10, 2024, status: 4 - Beta, requires: pytest>=3.10

Pytest fixtures for writing container based tests

```
pytest-contextfixture
      last release: Mar 12, 2013, status: 4 - Beta, requires: N/A
      Define pytest fixtures as context managers.
pytest-contexts
      last release: May 19, 2021, status: 4 - Beta, requires: N/A
      A plugin to run tests written with the Contexts framework using pytest
pytest-continuous
      last release: Apr 23, 2024, status: N/A, requires: N/A
      A pytest plugin to run tests continuously until failure or interruption.
pytest-cookies
      last release: Mar 22, 2023, status: 5 - Production/Stable, requires: pytest (>=3.9.0)
      The pytest plugin for your Cookiecutter templates. ③
pytest-copie
      last release: Jun 26, 2024, status: 3 - Alpha, requires: pytest
      The pytest plugin for your copier templates
pytest-copier
      last release: Dec 11, 2023, status: 4 - Beta, requires: pytest>=7.3.2
      A pytest plugin to help testing Copier templates
pytest-couchdbkit
      last release: Apr 17, 2012, status: N/A, requires: N/A
      py.test extension for per-test couchdb databases using couchdbkit
pytest-count
      last release: Jan 12, 2018, status: 4 - Beta, requires: N/A
      count erros and send email
pytest-cov
      last release: Mar 24, 2024, status: 5 - Production/Stable, requires: pytest>=4.6
      Pytest plugin for measuring coverage.
pytest-cover
      last release: Aug 01, 2015, status: 5 - Production/Stable, requires: N/A
      Pytest plugin for measuring coverage. Forked from 'pytest-cov'.
pytest-coverage
      last release: Jun 17, 2015, status: N/A, requires: N/A
pytest-coverage-context
      last release: Jun 28, 2023, status: 4 - Beta, requires: N/A
      Coverage dynamic context support for PyTest, including sub-processes
pytest-coveragemarkers
      last release: Aug 14, 2024, status: N/A, requires: pytest<8.0.0,>=7.1.2
      Using pytest markers to track functional coverage and filtering of tests
```

last release: Apr 29, 2016, status: 4 - Beta, requires: pytest (>=2.8.0,<2.9.0); extra == 'dev'

Pytest plugin for excluding tests based on coverage data

pytest-cov-exclude

```
pytest_covid
      last release: Jun 24, 2020, status: N/A, requires: N/A
      Too many faillure, less tests.
pytest-cpp
      last release: Nov 01, 2023, status: 5 - Production/Stable, requires: pytest >=7.0
      Use pytest's runner to discover and execute C++ tests
pytest-cqase
      last release: Aug 22, 2022, status: N/A, requires: pytest (>=7.1.2,<8.0.0)
      Custom qase pytest plugin
pytest-cram
      last release: Aug 08, 2020, status: N/A, requires: N/A
      Run cram tests with pytest.
pytest-crate
      last release: May 28, 2019, status: 3 - Alpha, requires: pytest (>=4.0)
      Manages CrateDB instances during your integration tests
pytest-crayons
      last release: Oct 08, 2023, status: N/A, requires: pytest
      A pytest plugin for colorful print statements
pytest-create
      last release: Feb 15, 2023, status: 1 - Planning, requires: N/A
      pytest-create
pytest-cricri
      last release: Jan 27, 2018, status: N/A, requires: pytest
      A Cricri plugin for pytest.
pytest-crontab
      last release: Dec 09, 2019, status: N/A, requires: N/A
      add crontab task in crontab
pytest-csv
      last release: Apr 22, 2021, status: N/A, requires: pytest (>=6.0)
      CSV output for pytest.
pytest-csv-params
      last release: Jul 01, 2023, status: 5 - Production/Stable, requires: pytest (>=7.4.0,<8.0.0)
      Pytest plugin for Test Case Parametrization with CSV files
pytest-curio
      last release: Oct 07, 2020, status: N/A, requires: N/A
      Pytest support for curio.
pytest-curl-report
      last release: Dec 11, 2016, status: 4 - Beta, requires: N/A
      pytest plugin to generate curl command line report
```

pytest-custom-concurrency

last release: Feb 08, 2021, status: N/A, requires: N/A

Custom grouping concurrence for pytest

pytest-custom-exit-code

last release: Aug 07, 2019, status: 4 - Beta, requires: pytest (>=4.0.2)

Exit pytest test session with custom exit code in different scenarios

pytest-custom-nodeid

last release: Mar 07, 2021, status: N/A, requires: N/A

Custom grouping for pytest-xdist, rename test cases name and test cases nodeid, support allure report

pytest-custom-outputs

last release: Jul 10, 2024, status: 4 - Beta, requires: pytest>=6.2.0

A plugin that allows users to create and use custom outputs instead of the standard Pass and Fail. Also allows users to retrieve test results in fixtures.

pytest-custom-report

last release: Jan 30, 2019, status: N/A, requires: pytest

Configure the symbols displayed for test outcomes

pytest-custom-scheduling

last release: Mar 01, 2021, status: N/A, requires: N/A

Custom grouping for pytest-xdist, rename test cases name and test cases nodeid, support allure report

pytest-cython

last release: Apr 05, 2024, status: 5 - Production/Stable, requires: pytest>=8

A plugin for testing Cython extension modules

pytest-cython-collect

last release: Jun 17, 2022, status: N/A, requires: pytest

pytest-darker

last release: Feb 25, 2024, status: N/A, requires: pytest <7,>=6.0.1

A pytest plugin for checking of modified code using Darker

pytest-dash

last release: Mar 18, 2019, status: N/A, requires: N/A

pytest fixtures to run dash applications.

pytest-dashboard

last release: May 30, 2024, status: N/A, requires: pytest<8.0.0,>=7.4.3

pytest-data

last release: Nov 01, 2016, status: 5 - Production/Stable, requires: N/A

Useful functions for managing data for pytest fixtures

pytest-databases

last release: Aug 20, 2024, status: 4 - Beta, requires: pytest

Reusable database fixtures for any and all databases.

pytest-databricks

last release: Jul 29, 2020, status: N/A, requires: pytest

Pytest plugin for remote Databricks notebooks testing

pytest-datadir

last release: Oct 03, 2023, status: 5 - Production/Stable, requires: pytest >=5.0

pytest plugin for test data directories and files

pytest-datadir-mgr

last release: Apr 06, 2023, status: 5 - Production/Stable, requires: pytest (>=7.1)

Manager for test data: downloads, artifact caching, and a tmpdir context.

pytest-datadir-ng

last release: Dec 25, 2019, status: 5 - Production/Stable, requires: pytest

Fixtures for pytest allowing test functions/methods to easily retrieve test resources from the local filesystem.

pytest-datadir-nng

last release: Nov 09, 2022, status: 5 - Production/Stable, requires: pytest (>=7.0.0,<8.0.0)

Fixtures for pytest allowing test functions/methods to easily retrieve test resources from the local filesystem.

pytest-data-extractor

last release: Jul 19, 2022, status: N/A, requires: pytest (>=7.0.1)

A pytest plugin to extract relevant metadata about tests into an external file (currently only json support)

pytest-data-file

last release: Dec 04, 2019, status: N/A, requires: N/A Fixture "data" and "case data" for test from yaml file

pytest-datafiles

last release: Feb 24, 2023, status: 5 - Production/Stable, requires: pytest (>=3.6)

py.test plugin to create a 'tmp_path' containing predefined files/directories.

pytest-datafixtures

last release: Dec 05, 2020, status: 5 - Production/Stable, requires: N/A

Data fixtures for pytest made simple

pytest-data-from-files

last release: Oct 13, 2021, status: 4 - Beta, requires: pytest

pytest plugin to provide data from files loaded automatically

pytest-dataplugin

last release: Sep 16, 2017, status: 1 - Planning, requires: N/A

A pytest plugin for managing an archive of test data.

pytest-datarecorder

last release: Jul 31, 2024, status: 5 - Production/Stable, requires: pytest

A py.test plugin recording and comparing test output.

pytest-dataset

last release: Sep 01, 2023, status: 5 - Production/Stable, requires: N/A

Plugin for loading different datasets for pytest by prefix from json or yaml files

pytest-data-suites

last release: Apr 06, 2024, status: N/A, requires: pytest<9.0,>=6.0

Class-based pytest parametrization

pytest-datatest

last release: Oct 15, 2020, status: 4 - Beta, requires: pytest (>=3.3)

A pytest plugin for test driven data-wrangling (this is the development version of datatest's pytest integration).

pytest-db

last release: Aug 22, 2024, *status*: N/A, *requires*: pytest Session scope fixture "db" for mysql query or change

pytest-dbfixtures

last release: Dec 07, 2016, status: 4 - Beta, requires: N/A

Databases fixtures plugin for py.test.

pytest-db-plugin

last release: Nov 27, 2021, status: N/A, requires: pytest (>=5.0)

pytest-dbt

last release: Jun 08, 2023, status: 2 - Pre-Alpha, requires: pytest (>=7.0.0,<8.0.0)

Unit test dbt models with standard python tooling

pytest-dbt-adapter

last release: Nov 24, 2021, status: N/A, requires: pytest (<7,>=6)

A pytest plugin for testing dbt adapter plugins

pytest-dbt-conventions

last release: Mar 02, 2022, status: N/A, requires: pytest (>=6.2.5,<7.0.0)

A pytest plugin for linting a dbt project's conventions

pytest-dbt-core

last release: Jun 04, 2024, status: N/A, requires: pytest>=6.2.5; extra == "test"

Pytest extension for dbt.

pytest-dbt-postgres

last release: Jan 02, 2024, status: N/A, requires: pytest (>=7.4.3,<8.0.0)

Pytest tooling to unittest DBT & Postgres models

pytest-dbus-notification

last release: Mar 05, 2014, status: 5 - Production/Stable, requires: N/A

D-BUS notifications for pytest results.

pytest-dbx

last release: Nov 29, 2022, status: N/A, requires: pytest (>=7.1.3,<8.0.0)

Pytest plugin to run unit tests for dbx (Databricks CLI extensions) related code

pytest-dc

last release: Aug 16, 2023, status: 5 - Production/Stable, requires: pytest >=3.3

Manages Docker containers during your integration tests

pytest-deadfixtures

last release: Jul 23, 2020, status: 5 - Production/Stable, requires: N/A

A simple plugin to list unused fixtures in pytest

pytest-deduplicate

last release: Aug 12, 2023, status: 4 - Beta, requires: pytest

Identifies duplicate unit tests

```
pytest-deepcov
      last release: Mar 30, 2021, status: N/A, requires: N/A
      deepcov
pytest-defer
      last release: Aug 24, 2021, status: N/A, requires: N/A
pytest-demo-plugin
      last release: May 15, 2021, status: N/A, requires: N/A
      pytest示例插件
pytest-dependency
      last release: Dec 31, 2023, status: 4 - Beta, requires: N/A
      Manage dependencies of tests
pytest-depends
      last release: Apr 05, 2020, status: 5 - Production/Stable, requires: pytest (>=3)
      Tests that depend on other tests
pytest-deprecate
      last release: Jul 01, 2019, status: N/A, requires: N/A
      Mark tests as testing a deprecated feature with a warning note.
pytest-describe
      last release: Feb 10, 2024, status: 5 - Production/Stable, requires: pytest <9,>=4.6
      Describe-style plugin for pytest
pytest-describe-it
      last release: Jul 19, 2019, status: 4 - Beta, requires: pytest
      plugin for rich text descriptions
pytest-deselect-if
      last release: Mar 24, 2024, status: 4 - Beta, requires: pytest>=6.2.0
      A plugin to deselect pytests tests rather than using skipif
pytest-devpi-server
      last release: May 28, 2019, status: 5 - Production/Stable, requires: pytest
      DevPI server fixture for py.test
pytest-dhos
      last release: Sep 07, 2022, status: N/A, requires: N/A
      Common fixtures for pytest in DHOS services and libraries
pytest-diamond
      last release: Aug 31, 2015, status: 4 - Beta, requires: N/A
      pytest plugin for diamond
pytest-dicom
      last release: Dec 19, 2018, status: 3 - Alpha, requires: pytest
      pytest plugin to provide DICOM fixtures
pytest-dictsdiff
      last release: Jul 26, 2019, status: N/A, requires: N/A
```

```
pytest-diff
      last release: Mar 30, 2019, status: 4 - Beta, requires: pytest (>=3.5.0)
      A simple plugin to use with pytest
pytest-diffeo
      last release: Feb 20, 2024, status: N/A, requires: N/A
      A package to prevent Dependency Confusion attacks against Yandex.
pytest-diff-selector
      last release: Feb 24, 2022, status: 4 - Beta, requires: pytest (>=6.2.2); extra == 'all'
      Get tests affected by code changes (using git)
pytest-difido
      last release: Oct 23, 2022, status: 4 - Beta, requires: pytest (>=4.0.0)
      PyTest plugin for generating Difido reports
pytest-dir-equal
      last release: Dec 11, 2023, status: 4 - Beta, requires: pytest>=7.3.2
      pytest-dir-equals is a pytest plugin providing helpers to assert directories equality allowing golden testing
pytest-dirty
      last release: Jul 11, 2024, status: 3 - Alpha, requires: pytest>=8.2; extra == "dev"
      Static import analysis for thrifty testing.
pytest-disable
      last release: Sep 10, 2015, status: 4 - Beta, requires: N/A
      pytest plugin to disable a test and skip it from testrun
pytest-disable-plugin
      last release: Feb 28, 2019, status: 4 - Beta, requires: pytest (>=3.5.0)
      Disable plugins per test
pytest-discord
      last release: May 11, 2024, status: 4 - Beta, requires: pytest!=6.0.0,<9,>=3.3.2
      A pytest plugin to notify test results to a Discord channel.
pytest-discover
      last release: Mar 26, 2024, status: N/A, requires: pytest
      Pytest plugin to record discovered tests in a file
pytest-ditto
      last release: Jun 09, 2024, status: 4 - Beta, requires: pytest>=3.5.0
      Snapshot testing pytest plugin with minimal ceremony and flexible persistence formats.
pytest-ditto-pandas
      last release: May 29, 2024, status: 4 - Beta, requires: pytest>=3.5.0
      pytest-ditto plugin for pandas snapshots.
pytest-ditto-pyarrow
      last release: Jun 09, 2024, status: 4 - Beta, requires: pytest>=3.5.0
```

pytest-ditto plugin for pyarrow tables.

pytest-django

last release: Jan 30, 2024, status: 5 - Production/Stable, requires: pytest >=7.0.0

A Django plugin for pytest.

pytest-django-ahead

last release: Oct 27, 2016, status: 5 - Production/Stable, requires: pytest (>=2.9)

A Django plugin for pytest.

pytest-djangoapp

last release: May 19, 2023, status: 4 - Beta, requires: pytest

Nice pytest plugin to help you with Django pluggable application testing.

pytest-django-cache-xdist

last release: May 12, 2020, status: 4 - Beta, requires: N/A

A djangocachexdist plugin for pytest

pytest-django-casperjs

last release: Mar 15, 2015, status: 2 - Pre-Alpha, requires: N/A

Integrate CasperJS with your django tests as a pytest fixture.

pytest-django-class

last release: Aug 08, 2023, status: 4 - Beta, requires: N/A

A pytest plugin for running django in class-scoped fixtures

pytest-django-docker-pg

last release: Jun 13, 2024, status: 5 - Production/Stable, requires: pytest<9.0.0,>=7.0.0

pytest-django-dotenv

last release: Nov 26, 2019, status: 4 - Beta, requires: pytest (>=2.6.0)

Pytest plugin used to setup environment variables with django-dotenv

pytest-django-factories

last release: Nov 12, 2020, status: 4 - Beta, requires: N/A

Factories for your Django models that can be used as Pytest fixtures.

pytest-django-filefield

last release: May 09, 2022, status: 5 - Production/Stable, requires: pytest >= 5.2

Replaces FileField.storage with something you can patch globally.

pytest-django-gcir

last release: Mar 06, 2018, status: 5 - Production/Stable, requires: N/A

A Django plugin for pytest.

pytest-django-haystack

last release: Sep 03, 2017, status: 5 - Production/Stable, requires: pytest (>=2.3.4)

Cleanup your Haystack indexes between tests

pytest-django-ifactory

last release: Aug 27, 2023, status: 5 - Production/Stable, requires: N/A

A model instance factory for pytest-django

pytest-django-lite

last release: Jan 30, 2014, status: N/A, requires: N/A

The bare minimum to integrate py.test with Django.

pytest-django-liveserver-ssl last release: Jan 20, 2022, status: 3 - Alpha, requires: N/A pytest-django-model last release: Feb 14, 2019, status: 4 - Beta, requires: N/A A Simple Way to Test your Django Models pytest-django-ordering last release: Jul 25, 2019, status: 5 - Production/Stable, requires: pytest (>=2.3.0) A pytest plugin for preserving the order in which Django runs tests. pytest-django-queries last release: Mar 01, 2021, status: N/A, requires: N/A Generate performance reports from your django database performance tests. pytest-djangorestframework last release: Aug 11, 2019, status: 4 - Beta, requires: N/A A djangorestframework plugin for pytest pytest-django-rq last release: Apr 13, 2020, status: 4 - Beta, requires: N/A A pytest plugin to help writing unit test for django-rq pytest-django-sqlcounts last release: Jun 16, 2015, status: 4 - Beta, requires: N/A py.test plugin for reporting the number of SQLs executed per django testcase. pytest-django-testing-postgresql last release: Jan 31, 2022, status: 4 - Beta, requires: N/A Use a temporary PostgreSQL database with pytest-django pytest-doc last release: Jun 28, 2015, status: 5 - Production/Stable, requires: N/A A documentation plugin for py.test. pytest-docfiles last release: Dec 22, 2021, status: 4 - Beta, requires: pytest (>=3.7.0) pytest plugin to test codeblocks in your documentation. pytest-docgen last release: Apr 17, 2020, status: N/A, requires: N/A An RST Documentation Generator for pytest-based test suites pytest-docker last release: Feb 02, 2024, status: N/A, requires: pytest <9.0,>=4.0 Simple pytest fixtures for Docker and Docker Compose based tests pytest-docker-apache-fixtures last release: Aug 12, 2024, status: 4 - Beta, requires: pytest Pytest fixtures for testing with apache2 (httpd).

last release: Jun 16, 2019, status: 3 - Alpha, requires: N/A

pytest-docker-butla

```
pytest-dockerc
      last release: Oct 09, 2020, status: 5 - Production/Stable, requires: pytest (>=3.0)
      Run, manage and stop Docker Compose project from Docker API
pytest-docker-compose
      last release: Jan 26, 2021, status: 5 - Production/Stable, requires: pytest (>=3.3)
      Manages Docker containers during your integration tests
pytest-docker-compose-v2
      last release: Feb 28, 2024, status: 4 - Beta, requires: pytest<8,>=7.2.2
      Manages Docker containers during your integration tests
pytest-docker-db
      last release: Mar 20, 2021, status: 5 - Production/Stable, requires: pytest (>=3.1.1)
      A plugin to use docker databases for pytests
pytest-docker-fixtures
      last release: Apr 03, 2024, status: 3 - Alpha, requires: N/A
      pytest docker fixtures
pytest-docker-git-fixtures
      last release: Aug 12, 2024, status: 4 - Beta, requires: pytest
      Pytest fixtures for testing with git scm.
pytest-docker-haproxy-fixtures
      last release: Aug 12, 2024, status: 4 - Beta, requires: pytest
      Pytest fixtures for testing with haproxy.
pytest-docker-pexpect
      last release: Jan 14, 2019, status: N/A, requires: pytest
      pytest plugin for writing functional tests with pexpect and docker
pytest-docker-postgresql
      last release: Sep 24, 2019, status: 4 - Beta, requires: pytest (>=3.5.0)
      A simple plugin to use with pytest
pytest-docker-py
      last release: Nov 27, 2018, status: N/A, requires: pytest (==4.0.0)
      Easy to use, simple to extend, pytest plugin that minimally leverages docker-py.
pytest-docker-registry-fixtures
      last release: Aug 12, 2024, status: 4 - Beta, requires: pytest
      Pytest fixtures for testing with docker registries.
pytest-docker-service
      last release: Jan 03, 2024, status: 3 - Alpha, requires: pytest (>=7.1.3)
      pytest plugin to start docker container
pytest-docker-squid-fixtures
      last release: Aug 12, 2024, status: 4 - Beta, requires: pytest
```

Pytest fixtures for testing with squid.

```
pytest-docker-tools
      last release: Feb 17, 2022, status: 4 - Beta, requires: pytest (>=6.0.1)
      Docker integration tests for pytest
pytest-docs
      last release: Nov 11, 2018, status: 4 - Beta, requires: pytest (>=3.5.0)
      Documentation tool for pytest
pytest-docstyle
      last release: Mar 23, 2020, status: 3 - Alpha, requires: N/A
      pytest plugin to run pydocstyle
pvtest-doctest-custom
      last release: Jul 25, 2016, status: 4 - Beta, requires: N/A
      A py.test plugin for customizing string representations of doctest results.
pytest-doctest-ellipsis-markers
      last release: Jan 12, 2018, status: 4 - Beta, requires: N/A
      Setup additional values for ELLIPSIS_MARKER for doctests
pytest-doctest-import
      last release: Nov 13, 2018, status: 4 - Beta, requires: pytest (>=3.3.0)
      A simple pytest plugin to import names and add them to the doctest namespace.
pytest-doctest-mkdocstrings
      last release: Mar 02, 2024, status: N/A, requires: pytest
      Run pytest -doctest-modules with markdown docstrings in code blocks (```)
pytest-doctestplus
      last release: Mar 10, 2024, status: 5 - Production/Stable, requires: pytest >=4.6
      Pytest plugin with advanced doctest features.
pytest-documentary
      last release: Jul 11, 2024, status: N/A, requires: pytest
      A simple pytest plugin to generate test documentation
pytest-dogu-report
      last release: Jul 07, 2023, status: N/A, requires: N/A
      pytest plugin for dogu report
pytest-dogu-sdk
      last release: Dec 14, 2023, status: N/A, requires: N/A
      pytest plugin for the Dogu
pytest-dolphin
      last release: Nov 30, 2016, status: 4 - Beta, requires: pytest (==3.0.4)
      Some extra stuff that we use ininternally
pytest-donde
      last release: Oct 01, 2023, status: 4 - Beta, requires: pytest >=7.3.1
      record pytest session characteristics per test item (coverage and duration) into a persistent file and use them in your
```

own plugin or script.

pytest-doorstop

last release: Jun 09, 2020, status: 4 - Beta, requires: pytest (>=3.5.0)

A pytest plugin for adding test results into doorstop items.

pytest-doteny

last release: Jun 16, 2020, status: 4 - Beta, requires: pytest (>=5.0.0)

A py.test plugin that parses environment files before running tests

pytest-dot-only-pkcopley

last release: Oct 27, 2023, status: N/A, requires: N/A

A Pytest marker for only running a single test

pytest-dparam

last release: Aug 27, 2024, status: 6 - Mature, requires: pytest

A more readable alternative to @pytest.mark.parametrize.

pytest-dpg

last release: Aug 13, 2024, status: N/A, requires: N/A

pytest-dpg is a pytest plugin for testing Dear PyGui (DPG) applications

pytest-draw

last release: Mar 21, 2023, status: 3 - Alpha, requires: pytest

Pytest plugin for randomly selecting a specific number of tests

pytest-drf

last release: Jul 12, 2022, status: 5 - Production/Stable, requires: pytest (>=3.7)

A Django REST framework plugin for pytest.

pytest-drivings

last release: Jan 13, 2021, status: N/A, requires: N/A

Tool to allow webdriver automation to be ran locally or remotely

pytest-drop-dup-tests

last release: Mar 04, 2024, status: 5 - Production/Stable, requires: pytest >=7

A Pytest plugin to drop duplicated tests during collection

pytest-dryrun

last release: Jul 18, 2023, status: 5 - Production/Stable, requires: pytest (>=7.4.0,<8.0.0)

A Pytest plugin to ignore tests during collection without reporting them in the test summary.

pytest-dummynet

last release: Dec 15, 2021, status: 5 - Production/Stable, requires: pytest

A py.test plugin providing access to a dummynet.

pytest-dump2json

last release: Jun 29, 2015, status: N/A, requires: N/A

A pytest plugin for dumping test results to json.

pytest-duration-insights

last release: Jul 15, 2024, status: N/A, requires: N/A

pytest-durations

last release: Apr 22, 2022, status: 5 - Production/Stable, requires: pytest (>=4.6)

Pytest plugin reporting fixtures and test functions execution time.

pytest-dynamicrerun

last release: Aug 15, 2020, status: 4 - Beta, requires: N/A

A pytest plugin to rerun tests dynamically based off of test outcome and output.

pytest-dynamodb

last release: Mar 12, 2024, status: 5 - Production/Stable, requires: pytest

DynamoDB fixtures for pytest

pytest-easy-addoption

last release: Jan 22, 2020, status: N/A, requires: N/A

pytest-easy-addoption: Easy way to work with pytest addoption

pytest-easy-api

last release: Feb 16, 2024, status: N/A, requires: N/A

A package to prevent Dependency Confusion attacks against Yandex.

pytest-easyMPI

last release: Oct 21, 2020, status: N/A, requires: N/A

Package that supports mpi tests in pytest

pytest-easyread

last release: Nov 17, 2017, status: N/A, requires: N/A

pytest plugin that makes terminal printouts of the reports easier to read

pytest-easy-server

last release: May 01, 2021, status: 4 - Beta, requires: pytest (<5.0.0,>=4.3.1); python_version < "3.5"

Pytest plugin for easy testing against servers

pytest-ebics-sandbox

last release: Aug 15, 2022, status: N/A, requires: N/A

A pytest plugin for testing against an EBICS sandbox server. Requires docker.

pytest-ec2

last release: Oct 22, 2019, status: 3 - Alpha, requires: N/A

Pytest execution on EC2 instance

pytest-echo

last release: Dec 05, 2023, status: 5 - Production/Stable, requires: pytest >=2.2

pytest plugin with mechanisms for echoing environment variables, package version and generic attributes

pytest-edit

last release: Jun 09, 2024, status: N/A, requires: pytest

Edit the source code of a failed test with 'pytest -edit'.

pytest-ekstazi

last release: Sep 10, 2022, status: N/A, requires: pytest

Pytest plugin to select test using Ekstazi algorithm

pytest-elasticsearch

last release: Mar 15, 2024, status: 5 - Production/Stable, requires: pytest >=7.0

Elasticsearch fixtures and fixture factories for Pytest.

pytest-elasticsearch-test

last release: Aug 21, 2024, status: 5 - Production/Stable, requires: pytest>=7.0

Elasticsearch fixtures and fixture factories for Pytest.

pytest-elements

last release: Jan 13, 2021, status: N/A, requires: pytest (>=5.4,<6.0)

Tool to help automate user interfaces

pytest-eliot

last release: Aug 31, 2022, status: 1 - Planning, requires: pytest (>=5.4.0)

An eliot plugin for pytest.

pytest-elk-reporter

last release: Jul 25, 2024, status: 4 - Beta, requires: pytest>=3.5.0

A simple plugin to use with pytest

pytest-email

last release: Jul 08, 2020, status: N/A, requires: pytest

Send execution result email

pytest-embedded

last release: Aug 19, 2024, status: 5 - Production/Stable, requires: pytest>=7.0

A pytest plugin that designed for embedded testing.

pytest-embedded-arduino

last release: Aug 19, 2024, status: 5 - Production/Stable, requires: N/A

Make pytest-embedded plugin work with Arduino.

pytest-embedded-idf

last release: Aug 19, 2024, status: 5 - Production/Stable, requires: N/A

Make pytest-embedded plugin work with ESP-IDF.

pytest-embedded-jtag

last release: Aug 19, 2024, status: 5 - Production/Stable, requires: N/A

Make pytest-embedded plugin work with JTAG.

pytest-embedded-gemu

last release: Aug 19, 2024, status: 5 - Production/Stable, requires: N/A

Make pytest-embedded plugin work with QEMU.

pytest-embedded-serial

last release: Aug 19, 2024, status: 5 - Production/Stable, requires: N/A

Make pytest-embedded plugin work with Serial.

pytest-embedded-serial-esp

last release: Aug 19, 2024, status: 5 - Production/Stable, requires: N/A

Make pytest-embedded plugin work with Espressif target boards.

pytest-embedded-wokwi

last release: Aug 19, 2024, status: 5 - Production/Stable, requires: N/A

Make pytest-embedded plugin work with the Wokwi CLI.

```
pytest-embrace
      last release: Mar 25, 2023, status: N/A, requires: pytest (>=7.0,<8.0)
      Dataclasses-as-tests. Describe the runtime once and multiply coverage with no boilerplate.
pytest-emoji
      last release: Feb 19, 2019, status: 4 - Beta, requires: pytest (>=4.2.1)
      A pytest plugin that adds emojis to your test result report
pytest-emoji-output
      last release: Apr 09, 2023, status: 4 - Beta, requires: pytest (==7.0.1)
      Pytest plugin to represent test output with emoji support
pytest-enabler
      last release: Aug 29, 2024, status: 5 - Production/Stable, requires: pytest!=8.1.*,>=6; extra == "test"
      Enable installed pytest plugins
pytest-encode
      last release: Nov 06, 2021, status: N/A, requires: N/A
      set your encoding and logger
pytest-encode-kane
      last release: Nov 16, 2021, status: N/A, requires: pytest
      set your encoding and logger
pytest-encoding
      last release: Aug 11, 2023, status: N/A, requires: pytest
      set your encoding and logger
pytest_energy_reporter
      last release: Mar 28, 2024, status: 3 - Alpha, requires: pytest<9.0.0,>=8.1.1
      An energy estimation reporter for pytest
pytest-enhanced-reports
      last release: Dec 15, 2022, status: N/A, requires: N/A
      Enhanced test reports for pytest
pytest-enhancements
      last release: Oct 30, 2019, status: 4 - Beta, requires: N/A
      Improvements for pytest (rejected upstream)
pytest-env
      last release: Nov 28, 2023, status: 5 - Production/Stable, requires: pytest>=7.4.3
      pytest plugin that allows you to add environment variables.
pytest-envfiles
      last release: Oct 08, 2015, status: 3 - Alpha, requires: N/A
      A py.test plugin that parses environment files before running tests
pytest-env-info
      last release: Nov 25, 2017, status: 4 - Beta, requires: pytest (>=3.1.1)
      Push information about the running pytest into envvars
```

```
pytest-environment
      last release: Mar 17, 2024, status: 1 - Planning, requires: N/A
      Pytest Environment
pytest-envraw
      last release: Aug 27, 2020, status: 4 - Beta, requires: pytest (>=2.6.0)
      py.test plugin that allows you to add environment variables.
pytest-envvars
      last release: Jun 13, 2020, status: 5 - Production/Stable, requires: pytest (>=3.0.0)
      Pytest plugin to validate use of envvars on your tests
pytest-env-yaml
      last release: Apr 02, 2019, status: N/A, requires: N/A
pytest-eradicate
      last release: Sep 08, 2020, status: N/A, requires: pytest (>=2.4.2)
      pytest plugin to check for commented out code
pytest_erp
      last release: Jan 13, 2015, status: N/A, requires: N/A
      py.test plugin to send test info to report portal dynamically
pytest-error-for-skips
      last release: Dec 19, 2019, status: 4 - Beta, requires: pytest (>=4.6)
      Pytest plugin to treat skipped tests a test failure
pytest-eth
      last release: Aug 14, 2020, status: 1 - Planning, requires: N/A
      PyTest plugin for testing Smart Contracts for Ethereum Virtual Machine (EVM).
pytest-ethereum
      last release: Jun 24, 2019, status: 3 - Alpha, requires: pytest (==3.3.2); extra == 'dev'
      pytest-ethereum: Pytest library for ethereum projects.
pytest-eucalyptus
      last release: Jun 28, 2022, status: N/A, requires: pytest (>=4.2.0)
      Pytest Plugin for BDD
pytest-eventlet
      last release: Oct 04, 2021, status: N/A, requires: pytest; extra == 'dev'
      Applies eventlet monkey-patch as a pytest plugin.
pytest-evm
      last release: Apr 22, 2024, status: 4 - Beta, requires: pytest<9.0.0,>=8.1.1
      The testing package containing tools to test Web3-based projects
pytest_exact_fixtures
      last release: Feb 04, 2019, status: N/A, requires: N/A
      Parse queries in Lucene and Elasticsearch syntaxes
pytest-examples
      last release: Aug 13, 2024, status: 4 - Beta, requires: pytest>=7
```

Pytest plugin for testing examples in docstrings and markdown files.

```
pytest-exasol-backend
      last release: Aug 23, 2024, status: N/A, requires: pytest<9,>=7
pytest-exasol-itde
      last release: Jul 01, 2024, status: N/A, requires: pytest<9,>=7
pytest-exasol-saas
      last release: Aug 06, 2024, status: N/A, requires: pytest<9,>=7
pytest-exasol-slc
      last release: Aug 29, 2024, status: N/A, requires: pytest<9,>=7
pytest-excel
      last release: Jun 18, 2024, status: 5 - Production/Stable, requires: pytest>3.6
      pytest plugin for generating excel reports
pytest-exceptional
      last release: Mar 16, 2017, status: 4 - Beta, requires: N/A
      Better exceptions
pytest-exception-script
      last release: Aug 04, 2020, status: 3 - Alpha, requires: pytest
      Walk your code through exception script to check it's resiliency to failures.
pytest-executable
      last release: Oct 07, 2023, status: N/A, requires: pytest <8,>=5
      pytest plugin for testing executables
pytest-execution-timer
      last release: Dec 24, 2021, status: 4 - Beta, requires: N/A
      A timer for the phases of Pytest's execution.
pytest-exit-code
      last release: May 06, 2024, status: 4 - Beta, requires: pytest>=6.2.0
      A pytest plugin that overrides the built-in exit codes to retain more information about the test results.
pytest-expect
      last release: Apr 21, 2016, status: 4 - Beta, requires: N/A
      py.test plugin to store test expectations and mark tests based on them
pytest-expectdir
      last release: Mar 19, 2023, status: 5 - Production/Stable, requires: pytest (>=5.0)
      A pytest plugin to provide initial/expected directories, and check a test transforms the initial directory to the ex-
      pected one
pytest-expecter
      last release: Sep 18, 2022, status: 5 - Production/Stable, requires: N/A
      Better testing with expecter and pytest.
pytest-expectr
      last release: Oct 05, 2018, status: N/A, requires: pytest (>=2.4.2)
      This plugin is used to expect multiple assert using pytest framework.
pytest-expect-test
      last release: Apr 10, 2023, status: 4 - Beta, requires: pytest (>=3.5.0)
```

A fixture to support expect tests in pytest

pytest-experiments

last release: Dec 13, 2021, status: 4 - Beta, requires: pytest (>=6.2.5,<7.0.0)

A pytest plugin to help developers of research-oriented software projects keep track of the results of their numerical experiments.

pytest-explicit

last release: Jun 15, 2021, status: 5 - Production/Stable, requires: pytest

A Pytest plugin to ignore certain marked tests by default

pytest-exploratory

last release: Aug 18, 2023, status: N/A, requires: pytest (>=6.2)

Interactive console for pytest.

pytest-explorer

last release: Aug 01, 2023, status: N/A, requires: N/A

terminal ui for exploring and running tests

pytest-ext

last release: Mar 31, 2024, status: N/A, requires: pytest>=5.3

pytest plugin for automation test

pytest-extensions

last release: Aug 17, 2022, status: 4 - Beta, requires: pytest; extra == 'testing'

A collection of helpers for pytest to ease testing

pytest-external-blockers

last release: Oct 05, 2021, status: N/A, requires: pytest

a special outcome for tests that are blocked for external reasons

pytest_extra

last release: Aug 14, 2014, status: N/A, requires: N/A

Some helpers for writing tests with pytest.

pytest-extra-durations

last release: Apr 21, 2020, status: 4 - Beta, requires: pytest (>=3.5.0)

A pytest plugin to get durations on a per-function basis and per module basis.

pytest-extra-markers

last release: Mar 05, 2023, status: 4 - Beta, requires: pytest

Additional pytest markers to dynamically enable/disable tests viia CLI flags

pytest-fabric

last release: Sep 12, 2018, status: 5 - Production/Stable, requires: N/A

Provides test utilities to run fabric task tests by using docker containers

pytest-factor

last release: Feb 20, 2024, status: N/A, requires: N/A

A package to prevent Dependency Confusion attacks against Yandex.

pytest-factory

last release: Sep 06, 2020, status: 3 - Alpha, requires: pytest (>4.3)

Use factories for test setup with py.test

pytest-factoryboy

last release: Mar 05, 2024, status: 6 - Mature, requires: pytest (>=6.2)

Factory Boy support for pytest.

pytest-factoryboy-fixtures

last release: Jun 25, 2020, status: N/A, requires: N/A

Generates pytest fixtures that allow the use of type hinting

pytest-factoryboy-state

last release: Mar 22, 2022, status: 5 - Production/Stable, requires: pytest (>=5.0)

Simple factoryboy random state management

pytest-failed-screen-record

last release: Jan 05, 2023, *status*: 4 - Beta, *requires*: pytest (>=7.1.2d,<8.0.0)

Create a video of the screen when pytest fails

pytest-failed-screenshot

last release: Apr 21, 2021, status: N/A, requires: N/A

Test case fails, take a screenshot, save it, attach it to the allure

pytest-failed-to-verify

last release: Aug 08, 2019, status: 5 - Production/Stable, requires: pytest (>=4.1.0)

A pytest plugin that helps better distinguishing real test failures from setup flakiness.

pytest-fail-slow

last release: Jun 01, 2024, status: N/A, requires: pytest>=7.0

Fail tests that take too long to run

pytest-failure-tracker

last release: Jul 17, 2024, status: N/A, requires: pytest>=6.0.0

A pytest plugin for tracking test failures over multiple runs

pytest-faker

last release: Dec 19, 2016, status: 6 - Mature, requires: N/A

Faker integration with the pytest framework.

pytest-falcon

last release: Sep 07, 2016, status: 4 - Beta, requires: N/A

Pytest helpers for Falcon.

pytest-falcon-client

last release: Feb 21, 2024, status: N/A, requires: N/A

A package to prevent Dependency Confusion attacks against Yandex.

pytest-fantasy

last release: Mar 14, 2019, status: N/A, requires: N/A

Pytest plugin for Flask Fantasy Framework

pytest-fastapi

last release: Dec 27, 2020, status: N/A, requires: N/A

pytest-fastapi-deps

last release: Jul 20, 2022, status: 5 - Production/Stable, requires: pytest

A fixture which allows easy replacement of fastapi dependencies for testing

```
pytest-fastest
      last release: Oct 04, 2023, status: 4 - Beta, requires: pytest (>=4.4)
      Use SCM and coverage to run only needed tests
pytest-fast-first
      last release: Jan 19, 2023, status: 3 - Alpha, requires: pytest
      Pytest plugin that runs fast tests first
pytest-faulthandler
      last release: Jul 04, 2019, status: 6 - Mature, requires: pytest (>=5.0)
      py.test plugin that activates the fault handler module for tests (dummy package)
pytest-fauna
      last release: Jul 31, 2024, status: N/A, requires: N/A
      A collection of helpful test fixtures for Fauna DB.
pytest-fauxfactory
      last release: Dec 06, 2017, status: 5 - Production/Stable, requires: pytest (>=3.2)
      Integration of fauxfactory into pytest.
pytest-figleaf
      last release: Jan 18, 2010, status: 5 - Production/Stable, requires: N/A
      py.test figleaf coverage plugin
pytest-file
      last release: Mar 18, 2024, status: 1 - Planning, requires: N/A
      Pytest File
pytest-filecov
      last release: Jun 27, 2021, status: 4 - Beta, requires: pytest
      A pytest plugin to detect unused files
pytest-filedata
      last release: Apr 29, 2024, status: 5 - Production/Stable, requires: N/A
      easily load test data from files
pytest-filemarker
      last release: Dec 01, 2020, status: N/A, requires: pytest
      A pytest plugin that runs marked tests when files change.
pytest-file-watcher
      last release: Mar 23, 2023, status: N/A, requires: pytest
      Pytest-File-Watcher is a CLI tool that watches for changes in your code and runs pytest on the changed files.
pytest-filter-case
      last release: Nov 05, 2020, status: N/A, requires: N/A
      run test cases filter by mark
pytest-filter-subpackage
      last release: Mar 04, 2024, status: 5 - Production/Stable, requires: pytest >=4.6
```

Pytest plugin for filtering based on sub-packages

pytest-find-dependencies

last release: Mar 16, 2024, status: 4 - Beta, requires: pytest >=4.3.0

A pytest plugin to find dependencies between tests

pytest-finer-verdicts

last release: Jun 18, 2020, status: N/A, requires: pytest (>=5.4.3)

A pytest plugin to treat non-assertion failures as test errors.

pytest-firefox

last release: Aug 08, 2017, status: 3 - Alpha, requires: pytest (>=3.0.2)

pytest plugin to manipulate firefox

pytest-fixture-classes

last release: Sep 02, 2023, status: 5 - Production/Stable, requires: pytest

Fixtures as classes that work well with dependency injection, autocompletetion, type checkers, and language servers

pytest-fixturecollection

last release: Feb 22, 2024, status: 4 - Beta, requires: pytest >=3.5.0

A pytest plugin to collect tests based on fixtures being used by tests

pytest-fixture-config

last release: May 28, 2019, status: 5 - Production/Stable, requires: pytest

Fixture configuration utils for py.test

pytest-fixture-maker

last release: Sep 21, 2021, status: N/A, requires: N/A

Pytest plugin to load fixtures from YAML files

pytest-fixture-marker

last release: Oct 11, 2020, status: 5 - Production/Stable, requires: N/A

A pytest plugin to add markers based on fixtures used.

pytest-fixture-order

last release: May 16, 2022, status: 5 - Production/Stable, requires: pytest (>=3.0)

pytest plugin to control fixture evaluation order

pytest-fixture-ref

last release: Nov 17, 2022, status: 4 - Beta, requires: N/A

Lets users reference fixtures without name matching magic.

pytest-fixture-remover

last release: Feb 14, 2024, status: 5 - Production/Stable, requires: N/A

A LibCST codemod to remove pytest fixtures applied via the usefixtures decorator, as well as its parametrizations.

pytest-fixture-rtttg

last release: Feb 23, 2022, status: N/A, requires: pytest (>=7.0.1,<8.0.0)

Warn or fail on fixture name clash

pytest-fixtures

last release: May 01, 2019, status: 5 - Production/Stable, requires: N/A

Common fixtures for pytest

pytest-fixture-tools

last release: Aug 15, 2024, status: 6 - Mature, requires: pytest

Plugin for pytest which provides tools for fixtures

pytest-fixture-typecheck

last release: Aug 24, 2021, status: N/A, requires: pytest

A pytest plugin to assert type annotations at runtime.

pytest-flake8

last release: Jul 21, 2024, status: 5 - Production/Stable, requires: pytest>=7.0

pytest plugin to check FLAKE8 requirements

pytest-flake8-path

last release: Jul 10, 2023, status: 5 - Production/Stable, requires: pytest

A pytest fixture for testing flake8 plugins.

pytest-flake8-v2

last release: Mar 01, 2022, status: 5 - Production/Stable, requires: pytest (>=7.0)

pytest plugin to check FLAKE8 requirements

pytest-flakefinder

last release: Oct 26, 2022, status: 4 - Beta, requires: pytest (>=2.7.1)

Runs tests multiple times to expose flakiness.

pytest-flakes

last release: Dec 02, 2021, status: 5 - Production/Stable, requires: pytest (>=5)

pytest plugin to check source code with pyflakes

pytest-flaptastic

last release: Mar 17, 2019, status: N/A, requires: N/A

Flaptastic py.test plugin

pytest-flask

last release: Oct 23, 2023, status: 5 - Production/Stable, requires: pytest >=5.2

A set of py.test fixtures to test Flask applications.

pytest-flask-ligand

last release: Apr 25, 2023, status: 4 - Beta, requires: pytest (~=7.3)

Pytest fixtures and helper functions to use for testing flask-ligand microservices.

pytest-flask-sqlalchemy

last release: Apr 30, 2022, status: 4 - Beta, requires: pytest (>=3.2.1)

A pytest plugin for preserving test isolation in Flask-SQlAlchemy using database transactions.

pytest-flask-sqlalchemy-transactions

last release: Aug 02, 2018, status: 4 - Beta, requires: pytest (>=3.2.1)

Run tests in transactions using pytest, Flask, and SQLalchemy.

pytest-flexreport

last release: Apr 15, 2023, status: 4 - Beta, requires: pytest

pytest-fluent

last release: Aug 14, 2024, status: 4 - Beta, requires: pytest>=7.0.0

A pytest plugin in order to provide logs via fluentd

```
pytest-fluentbit
      last release: Jun 16, 2023, status: 4 - Beta, requires: pytest (>=7.0.0)
      A pytest plugin in order to provide logs via fluentbit
pytest-fly
      last release: Apr 14, 2024, status: 3 - Alpha, requires: pytest
      pytest observer
pytest-flyte
      last release: May 03, 2021, status: N/A, requires: pytest
      Pytest fixtures for simplifying Flyte integration testing
pytest-focus
      last release: May 04, 2019, status: 4 - Beta, requires: pytest
      A pytest plugin that alerts user of failed test cases with screen notifications
pytest-forbid
      last release: Mar 07, 2023, status: N/A, requires: pytest (>=7.2.2,<8.0.0)
pytest-forcefail
      last release: May 15, 2018, status: 4 - Beta, requires: N/A
      py.test plugin to make the test failing regardless of pytest.mark.xfail
pytest-forks
      last release: Mar 05, 2024, status: N/A, requires: N/A
      Fork helper for pytest
pytest-forward-compatability
      last release: Sep 06, 2020, status: N/A, requires: N/A
      A name to avoid typosquating pytest-foward-compatibility
pytest-forward-compatibility
      last release: Sep 29, 2020, status: N/A, requires: N/A
      A pytest plugin to shim pytest commandline options for fowards compatibility
pytest-frappe
      last release: Jul 30, 2024, status: 4 - Beta, requires: pytest>=7.0.0
      Pytest Frappe Plugin - A set of pytest fixtures to test Frappe applications
pytest-freezeblaster
      last release: Jul 10, 2024, status: N/A, requires: pytest>=6.2.5
      Wrap tests with fixtures in freeze_time
pytest-freezegun
      last release: Jul 19, 2020, status: 4 - Beta, requires: pytest (>=3.0.0)
      Wrap tests with fixtures in freeze_time
pytest-freezer
      last release: Jun 21, 2023, status: N/A, requires: pytest >= 3.6
      Pytest plugin providing a fixture interface for spulec/freezegun
pytest-freeze-reqs
      last release: Apr 29, 2021, status: N/A, requires: N/A
```

Check if requirement files are frozen

```
pytest-frozen-uuids
      last release: Apr 17, 2022, status: N/A, requires: pytest (>=3.0)
      Deterministically frozen UUID's for your tests
pytest-func-cov
      last release: Apr 15, 2021, status: 3 - Alpha, requires: pytest (>=5)
      Pytest plugin for measuring function coverage
pytest-funparam
      last release: Dec 02, 2021, status: 4 - Beta, requires: pytest >=4.6.0
      An alternative way to parametrize test cases.
pvtest-fxa
      last release: Aug 28, 2018, status: 5 - Production/Stable, requires: N/A
      pytest plugin for Firefox Accounts
pytest-fxtest
      last release: Oct 27, 2020, status: N/A, requires: N/A
pytest-fzf
      last release: Jul 03, 2024, status: 4 - Beta, requires: pytest>=6.0.0
      fzf-based test selector for pytest
pytest gae
      last release: Aug 03, 2016, status: 3 - Alpha, requires: N/A
      pytest plugin for apps written with Google's AppEngine
pytest-gather-fixtures
      last release: Aug 18, 2024, status: N/A, requires: pytest>=7.0.0
      set up asynchronous pytest fixtures concurrently
pytest-gc
      last release: Feb 01, 2018, status: N/A, requires: N/A
      The garbage collector plugin for py.test
pytest-gcov
      last release: Feb 01, 2018, status: 3 - Alpha, requires: N/A
      Uses goov to measure test coverage of a C library
pytest-gcs
      last release: Mar 01, 2024, status: 5 - Production/Stable, requires: pytest >=6.2
      GCS fixtures and fixture factories for Pytest.
pytest-gee
      last release: Jun 30, 2024, status: 3 - Alpha, requires: pytest
      The Python plugin for your GEE based packages.
pytest-gevent
      last release: Feb 25, 2020, status: N/A, requires: pytest
      Ensure that gevent is properly patched when invoking pytest
pytest-gherkin
      last release: Jul 27, 2019, status: 3 - Alpha, requires: pytest (>=5.0.0)
```

A flexible framework for executing BDD gherkin tests

```
pytest-gh-log-group
      last release: Jan 11, 2022, status: 3 - Alpha, requires: pytest
      pytest plugin for gh actions
pytest-ghostinspector
      last release: May 17, 2016, status: 3 - Alpha, requires: N/A
      For finding/executing Ghost Inspector tests
pytest-girder
      last release: Jul 08, 2024, status: N/A, requires: pytest>=3.6
      A set of pytest fixtures for testing Girder applications.
pytest-git
      last release: May 28, 2019, status: 5 - Production/Stable, requires: pytest
      Git repository fixture for py.test
pytest-gitconfig
      last release: Aug 11, 2024, status: 4 - Beta, requires: pytest>=7.1.2
      Provide a Git config sandbox for testing
pytest-gitcov
      last release: Jan 11, 2020, status: 2 - Pre-Alpha, requires: N/A
      Pytest plugin for reporting on coverage of the last git commit.
pytest-git-diff
      last release: Apr 02, 2024, status: N/A, requires: N/A
      Pytest plugin that allows the user to select the tests affected by a range of git commits
pytest-git-fixtures
      last release: Mar 11, 2021, status: 4 - Beta, requires: pytest
      Pytest fixtures for testing with git.
pytest-github
      last release: Mar 07, 2019, status: 5 - Production/Stable, requires: N/A
      Plugin for py.test that associates tests with github issues using a marker.
pytest-github-actions-annotate-failures
      last release: May 04, 2023, status: 5 - Production/Stable, requires: pytest (>=4.0.0)
      pytest plugin to annotate failed tests with a workflow command for GitHub Actions
pytest-github-report
      last release: Jun 03, 2022, status: 4 - Beta, requires: N/A
      Generate a GitHub report using pytest in GitHub Workflows
pytest-gitignore
      last release: Jul 17, 2015, status: 4 - Beta, requires: N/A
      py.test plugin to ignore the same files as git
```

pytest-gitlab

Pytest Plugin for Gitlab

last release: Aug 30, 2024, status: N/A, requires: N/A

pytest-gitlabci-parallelized

last release: Mar 08, 2023, status: N/A, requires: N/A

Parallelize pytest across GitLab CI workers.

pytest-gitlab-code-quality

last release: Apr 03, 2024, status: N/A, requires: pytest>=8.1.1

Collects warnings while testing and generates a GitLab Code Quality Report.

pytest-gitlab-fold

last release: Dec 31, 2023, status: 4 - Beta, requires: pytest >=2.6.0

Folds output sections in GitLab CI build log

pytest-git-selector

last release: Nov 17, 2022, status: N/A, requires: N/A

Utility to select tests that have had its dependencies modified (as identified by git diff)

pytest-glamor-allure

last release: Apr 30, 2024, status: 4 - Beta, requires: pytest<=8.2.0

Extends allure-pytest functionality

pytest-gnupg-fixtures

last release: Mar 04, 2021, status: 4 - Beta, requires: pytest

Pytest fixtures for testing with gnupg.

pytest-golden

last release: Jul 18, 2022, status: N/A, requires: pytest (>=6.1.2)

Plugin for pytest that offloads expected outputs to data files

pytest-goldie

last release: May 23, 2023, status: 4 - Beta, requires: pytest (>=3.5.0)

A plugin to support golden tests with pytest.

pytest-google-chat

last release: Mar 27, 2022, status: 4 - Beta, requires: pytest

Notify google chat channel for test results

pytest-graphql-schema

last release: Oct 18, 2019, status: N/A, requires: N/A

Get graphql schema as fixture for pytest

pytest-greendots

last release: Feb 08, 2014, status: 3 - Alpha, requires: N/A

Green progress dots

pytest-group-by-class

last release: Jun 27, 2023, status: 5 - Production/Stable, requires: pytest (>=2.5)

A Pytest plugin for running a subset of your tests by splitting them in to groups of classes.

pytest-growl

last release: Jan 13, 2014, status: 5 - Production/Stable, requires: N/A

Growl notifications for pytest results.

```
pytest-grpc
      last release: May 01, 2020, status: N/A, requires: pytest (>=3.6.0)
      pytest plugin for grpc
pytest-grunnur
      last release: Jul 26, 2024, status: N/A, requires: pytest>=6
      Py.Test plugin for Grunnur-based packages.
pytest_gui_status
      last release: Jan 23, 2016, status: N/A, requires: pytest
      Show pytest status in gui
pytest-hammertime
      last release: Jul 28, 2018, status: N/A, requires: pytest
      Display "\square" instead of "." for passed pytest tests.
pytest-hardware-test-report
      last release: Apr 01, 2024, status: 4 - Beta, requires: pytest<9.0.0,>=8.0.0
      A simple plugin to use with pytest
pytest-harmony
      last release: Jan 17, 2023, status: N/A, requires: pytest (>=7.2.1,<8.0.0)
      Chain tests and data with pytest
pytest-harvest
      last release: Mar 16, 2024, status: 5 - Production/Stable, requires: N/A
      Store data created during your pytest tests execution, and retrieve it at the end of the session, e.g. for applicative
      benchmarking purposes.
pytest-helm-charts
      last release: Feb 07, 2024, status: 4 - Beta, requires: pytest (>=8.0.0,<9.0.0)
      A plugin to provide different types and configs of Kubernetes clusters that can be used for testing.
pytest-helm-templates
      last release: Aug 07, 2024, status: N/A, requires: pytest~=7.4.0; extra == "dev"
      Pytest fixtures for unit testing the output of helm templates
pytest-helper
      last release: May 31, 2019, status: 5 - Production/Stable, requires: N/A
      Functions to help in using the pytest testing framework
pytest-helpers
      last release: May 17, 2020, status: N/A, requires: pytest
      pytest helpers
pytest-helpers-namespace
      last release: Dec 29, 2021, status: 5 - Production/Stable, requires: pytest (>=6.0.0)
      Pytest Helpers Namespace Plugin
pytest-henry
      last release: Aug 29, 2023, status: N/A, requires: N/A
pytest-hidecaptured
```

last release: May 04, 2018, status: 4 - Beta, requires: pytest (>=2.8.5)

Hide captured output

pytest-himark

last release: Jun 05, 2024, status: 4 - Beta, requires: pytest>=6.2.0

This plugin aims to create markers automatically based on a json configuration.

pytest-historic

last release: Apr 08, 2020, status: N/A, requires: pytest

Custom report to display pytest historical execution records

pytest-historic-hook

last release: Apr 08, 2020, status: N/A, requires: pytest

Custom listener to store execution results into MYSQL DB, which is used for pytest-historic report

pytest-history

last release: Jan 14, 2024, *status*: N/A, *requires*: pytest (>=7.4.3,<8.0.0)

Pytest plugin to keep a history of your pytest runs

pytest-home

last release: Jul 28, 2024, status: 5 - Production/Stable, requires: pytest

Home directory fixtures

pytest-homeassistant

last release: Aug 12, 2020, status: 4 - Beta, requires: N/A

A pytest plugin for use with homeassistant custom components.

pytest-homeassistant-custom-component

last release: Aug 31, 2024, status: 3 - Alpha, requires: pytest==8.3.1

Experimental package to automatically extract test plugins for Home Assistant custom components

pytest-honey

last release: Jan 07, 2022, status: 4 - Beta, requires: pytest (>=3.5.0)

A simple plugin to use with pytest

pytest-honors

last release: Mar 06, 2020, status: 4 - Beta, requires: N/A

Report on tests that honor constraints, and guard against regressions

pytest-hot-reloading

last release: Apr 18, 2024, status: N/A, requires: N/A

pytest-hot-test

last release: Dec 10, 2022, status: 4 - Beta, requires: pytest (>=3.5.0)

A plugin that tracks test changes

pytest-houdini

last release: Jul 15, 2024, status: N/A, requires: pytest

pytest plugin for testing code in Houdini.

pytest-hoverfly

last release: Jan 30, 2023, status: N/A, requires: pytest (>=5.0)

Simplify working with Hoverfly from pytest

```
pytest-hoverfly-wrapper
      last release: Feb 27, 2023, status: 5 - Production/Stable, requires: pytest (>=3.7.0)
      Integrates the Hoverfly HTTP proxy into Pytest
pytest-hpfeeds
      last release: Feb 28, 2023, status: 4 - Beta, requires: pytest (>=6.2.4,<7.0.0)
      Helpers for testing hpfeeds in your python project
pytest-html
      last release: Nov 07, 2023, status: 5 - Production/Stable, requires: pytest>=7.0.0
      pytest plugin for generating HTML reports
pytest-html-cn
      last release: Aug 19, 2024, status: 5 - Production/Stable, requires: pytest!=6.0.0,>=5.0
      pytest plugin for generating HTML reports
pytest-html-lee
      last release: Jun 30, 2020, status: 5 - Production/Stable, requires: pytest (>=5.0)
      optimized pytest plugin for generating HTML reports
pytest-html-merger
      last release: Jul 12, 2024, status: N/A, requires: N/A
      Pytest HTML reports merging utility
pytest-html-object-storage
      last release: Jan 17, 2024, status: 5 - Production/Stable, requires: N/A
      Pytest report plugin for send HTML report on object-storage
pytest-html-profiling
      last release: Feb 11, 2020, status: 5 - Production/Stable, requires: pytest (>=3.0)
      Pytest plugin for generating HTML reports with per-test profiling and optionally call graph visualizations. Based
      on pytest-html by Dave Hunt.
pytest-html-reporter
      last release: Feb 13, 2022, status: N/A, requires: N/A
      Generates a static html report based on pytest framework
pytest-html-report-merger
      last release: May 22, 2024, status: N/A, requires: N/A
pytest-html-thread
      last release: Dec 29, 2020, status: 5 - Production/Stable, requires: N/A
      pytest plugin for generating HTML reports
pytest-http
      last release: Aug 22, 2024, status: N/A, requires: pytest
      Fixture "http" for http requests
pytest-httpbin
      last release: May 08, 2023, status: 5 - Production/Stable, requires: pytest; extra == 'test'
      Easily test your HTTP library against a local copy of httpbin
pytest-httpdbg
      last release: Jan 10, 2024, status: 3 - Alpha, requires: pytest >=7.0.0
```

```
A pytest plugin to record HTTP(S) requests with stack trace
pytest-http-mocker
      last release: Oct 20, 2019, status: N/A, requires: N/A
      Pytest plugin for http mocking (via https://github.com/vilus/mocker)
pytest-httpretty
      last release: Feb 16, 2014, status: 3 - Alpha, requires: N/A
      A thin wrapper of HTTPretty for pytest
pytest_httpserver
      last release: Aug 11, 2024, status: 3 - Alpha, requires: N/A
      pytest-httpserver is a httpserver for pytest
pytest-httptesting
      last release: Aug 10, 2024, status: N/A, requires: pytest<9.0.0,>=8.2.0
      http_testing framework on top of pytest
pytest-httpx
      last release: Feb 21, 2024, status: 5 - Production/Stable, requires: pytest <9,>=7
      Send responses to httpx.
pytest-httpx-blockage
      last release: Feb 16, 2023, status: N/A, requires: pytest (>=7.2.1)
      Disable httpx requests during a test run
pytest-httpx-recorder
      last release: Jan 04, 2024, status: 5 - Production/Stable, requires: pytest
      Recorder feature based on pytest_httpx, like recorder feature in responses.
pytest-hue
      last release: May 09, 2019, status: N/A, requires: N/A
      Visualise PyTest status via your Phillips Hue lights
pytest-hylang
      last release: Mar 28, 2021, status: N/A, requires: pytest
      Pytest plugin to allow running tests written in hylang
pytest-hypo-25
      last release: Jan 12, 2020, status: 3 - Alpha, requires: N/A
      help hypo module for pytest
pytest-iam
      last release: Jul 25, 2024, status: 4 - Beta, requires: pytest>=7.0.0
      A fully functional OAUTH2 / OpenID Connect (OIDC) server to be used in your testsuite
pytest-ibutsu
      last release: Aug 05, 2022, status: 4 - Beta, requires: pytest>=7.1
      A plugin to sent pytest results to an Ibutsu server
pytest-icdiff
```

last release: Dec 05, 2023, *status*: 4 - Beta, *requires*: pytest use icdiff for better error messages in pytest assertions

pytest-idapro

last release: Nov 03, 2018, status: N/A, requires: N/A

A pytest plugin for idapython. Allows a pytest setup to run tests outside and inside IDA in an automated manner by runnig pytest inside IDA and by mocking idapython api

pytest-idem

last release: Dec 13, 2023, status: 5 - Production/Stable, requires: N/A

A pytest plugin to help with testing idem projects

pytest-idempotent

last release: Jul 25, 2022, status: N/A, requires: N/A

Pytest plugin for testing function idempotence.

pytest-ignore-flaky

last release: Apr 20, 2024, status: 5 - Production/Stable, requires: pytest>=6.0

ignore failures from flaky tests (pytest plugin)

pytest-ignore-test-results

last release: Aug 17, 2023, status: 2 - Pre-Alpha, requires: pytest>=7.0

A pytest plugin to ignore test results.

pytest-image-diff

last release: Mar 09, 2023, status: 3 - Alpha, requires: pytest

pytest-image-snapshot

last release: Jul 01, 2024, status: 4 - Beta, requires: pytest>=3.5.0

A pytest plugin for image snapshot management and comparison.

pytest-import-check

last release: Jul 19, 2024, status: 3 - Alpha, requires: pytest>=8.1

pytest plugin to check whether Python modules can be imported

pytest-incremental

last release: Apr 24, 2021, status: 5 - Production/Stable, requires: N/A

an incremental test runner (pytest plugin)

pytest-infinity

last release: Jun 09, 2024, status: N/A, requires: pytest<9.0.0,>=8.0.0

pytest-influxdb

last release: Apr 20, 2021, status: N/A, requires: N/A

Plugin for influxdb and pytest integration.

pytest-info-collector

last release: May 26, 2019, status: 3 - Alpha, requires: N/A

pytest plugin to collect information from tests

pytest-info-plugin

last release: Sep 14, 2023, status: N/A, requires: N/A

Get executed interface information in pytest interface automation framework

pytest-informative-node

last release: Apr 25, 2019, status: 4 - Beta, requires: N/A

display more node ininformation.

pytest-infrastructure

last release: Apr 12, 2020, status: 4 - Beta, requires: N/A

pytest stack validation prior to testing executing

pytest-ini

last release: Apr 26, 2022, status: N/A, requires: N/A

Reuse pytest.ini to store env variables

pytest-initry

last release: Apr 30, 2024, status: N/A, requires: pytest<9.0.0,>=8.1.1

Plugin for sending automation test data from Pytest to the initry

pytest-inline

last release: Oct 19, 2023, status: 4 - Beta, requires: pytest >=7.0.0

A pytest plugin for writing inline tests.

pytest-inmanta

last release: Aug 19, 2024, status: 5 - Production/Stable, requires: pytest

A py.test plugin providing fixtures to simplify inmanta modules testing.

pytest-inmanta-extensions

last release: Jul 22, 2024, status: 5 - Production/Stable, requires: N/A

Inmanta tests package

pytest-inmanta-lsm

last release: Aug 20, 2024, status: 5 - Production/Stable, requires: N/A

Common fixtures for inmanta LSM related modules

pytest-inmanta-yang

last release: Feb 22, 2024, status: 4 - Beta, requires: pytest

Common fixtures used in inmanta yang related modules

pytest-Inomaly

last release: Feb 13, 2018, status: 4 - Beta, requires: N/A

A simple image diff plugin for pytest

pytest-in-robotframework

last release: Mar 02, 2024, status: N/A, requires: pytest

The extension enables easy execution of pytest tests within the Robot Framework environment.

pytest-insper

last release: Mar 21, 2024, status: N/A, requires: pytest

Pytest plugin for courses at Insper

pytest-insta

last release: Feb 19, 2024, status: N/A, requires: pytest (>=7.2.0,<9.0.0)

A practical snapshot testing plugin for pytest

pytest-instafail

last release: Mar 31, 2023, *status*: 4 - Beta, *requires*: pytest (>=5)

pytest plugin to show failures instantly

```
pytest-instrument
      last release: Apr 05, 2020, status: 5 - Production/Stable, requires: pytest (>=5.1.0)
      pytest plugin to instrument tests
pytest-integration
      last release: Nov 17, 2022, status: N/A, requires: N/A
      Organizing pytests by integration or not
pytest-integration-mark
      last release: May 22, 2023, status: N/A, requires: pytest (>=5.2)
      Automatic integration test marking and excluding plugin for pytest
pytest-interactive
      last release: Nov 30, 2017, status: 3 - Alpha, requires: N/A
      A pytest plugin for console based interactive test selection just after the collection phase
pytest-intercept-remote
      last release: May 24, 2021, status: 4 - Beta, requires: pytest (>=4.6)
      Pytest plugin for intercepting outgoing connection requests during pytest run.
pytest-interface-tester
      last release: Aug 09, 2024, status: 4 - Beta, requires: pytest
      Pytest plugin for checking charm relation interface protocol compliance.
pytest-invenio
      last release: Jun 27, 2024, status: 5 - Production/Stable, requires: pytest<7.2.0,>=6
      Pytest fixtures for Invenio.
pytest-involve
      last release: Feb 02, 2020, status: 4 - Beta, requires: pytest (>=3.5.0)
      Run tests covering a specific file or changeset
pytest-ipdb
      last release: Mar 20, 2013, status: 2 - Pre-Alpha, requires: N/A
      A py.test plug-in to enable drop to ipdb debugger on test failure.
pytest-ipynb
      last release: Jan 29, 2019, status: 3 - Alpha, requires: N/A
      THIS PROJECT IS ABANDONED
pytest-ipywidgets
      last release: Aug 30, 2024, status: N/A, requires: pytest
pytest-isolate
      last release: Feb 20, 2023, status: 4 - Beta, requires: pytest
pytest-isort
      last release: Mar 05, 2024, status: 5 - Production/Stable, requires: pytest (>=5.0)
      py.test plugin to check import ordering using isort
pytest-it
```

Pytest plugin to display test reports as a plaintext spec, inspired by Rspec; https://github.com/mattduck/pytest-it.

last release: Jan 29, 2024, status: 4 - Beta, requires: N/A

pytest-iterassert last release: May 11, 2020, status: 3 - Alpha, requires: N/A Nicer list and iterable assertion messages for pytest pytest-iteration last release: Aug 22, 2024, status: N/A, requires: pytest Add iteration mark for tests pytest-iters last release: May 24, 2022, status: N/A, requires: N/A A contextmanager pytest fixture for handling multiple mock iters pytest_jar_yuan last release: Dec 12, 2022, status: N/A, requires: N/A A allure and pytest used package pytest-jasmine last release: Nov 04, 2017, status: 1 - Planning, requires: N/A Run jasmine tests from your pytest test suite pytest-jelastic *last release*: Nov 16, 2022, *status*: N/A, *requires*: pytest (>=7.2.0,<8.0.0) Pytest plugin defining the necessary command-line options to pass to pytests testing a Jelastic environment. pytest-jest last release: May 22, 2018, status: 4 - Beta, requires: pytest (>=3.3.2) A custom jest-pytest oriented Pytest reporter pytest-jinja last release: Oct 04, 2022, status: 3 - Alpha, requires: pytest (>=6.2.5,<7.0.0) A plugin to generate customizable jinja-based HTML reports in pytest pytest-jira last release: Apr 30, 2024, status: 3 - Alpha, requires: N/A py.test JIRA integration plugin, using markers pytest-jira-xfail last release: Jul 09, 2024, status: N/A, requires: pytest>=7.2.0 Plugin skips (xfail) tests if unresolved Jira issue(s) linked pytest-jira-xray last release: Jul 19, 2024, status: 4 - Beta, requires: pytest>=6.2.4 pytest plugin to integrate tests with JIRA XRAY

pytest-job-selection last release: Jan 30, 2023, status: 4 - Beta, requires: pytest (>=3.5.0)

A pytest plugin for load balancing test suites

pytest-jobserver

last release: May 15, 2019, status: 5 - Production/Stable, requires: pytest

Limit parallel tests with posix jobserver.

```
pytest-joke
      last release: Oct 08, 2019, status: 4 - Beta, requires: pytest (>=4.2.1)
      Test failures are better served with humor.
pytest-json
      last release: Jan 18, 2016, status: 4 - Beta, requires: N/A
      Generate JSON test reports
pytest-json-ctrf
      last release: Aug 17, 2024, status: N/A, requires: pytest>6.0.0
      Pytest plugin to generate json report in CTRF (Common Test Report Format)
pytest-json-fixtures
      last release: Mar 14, 2023, status: 4 - Beta, requires: N/A
      JSON output for the -fixtures flag
pytest-jsonlint
      last release: Aug 04, 2016, status: N/A, requires: N/A
      UNKNOWN
pytest-json-report
      last release: Mar 15, 2022, status: 4 - Beta, requires: pytest (>=3.8.0)
      A pytest plugin to report test results as JSON files
pytest-json-report-wip
      last release: Oct 28, 2023, status: 4 - Beta, requires: pytest >=3.8.0
      A pytest plugin to report test results as JSON files
pytest-jsonschema
      last release: Mar 27, 2024, status: 4 - Beta, requires: pytest>=6.2.0
      A pytest plugin to perform JSONSchema validations
pytest-jtr
      last release: Jul 21, 2024, status: N/A, requires: pytest<8.0.0,>=7.1.2
      pytest plugin supporting json test report output
pytest-jupyter
      last release: Apr 04, 2024, status: 4 - Beta, requires: pytest>=7.0
      A pytest plugin for testing Jupyter libraries and extensions.
pytest-jupyterhub
      last release: Apr 25, 2023, status: 5 - Production/Stable, requires: pytest
      A reusable JupyterHub pytest plugin
pytest-kafka
      last release: Aug 14, 2024, status: N/A, requires: pytest
      Zookeeper, Kafka server, and Kafka consumer fixtures for Pytest
pytest-kafkavents
      last release: Sep 08, 2021, status: 4 - Beta, requires: pytest
```

A plugin to send pytest events to Kafka

pytest-kairos last release: Aug 08, 2024, status: 5 - Production/Stable, requires: pytest>=5.0.0 Pytest plugin with random number generation, reproducibility, and test repetition pytest-kasima last release: Jan 26, 2023, status: 5 - Production/Stable, requires: pytest (>=7.2.1,<8.0.0) Display horizontal lines above and below the captured standard output for easy viewing. pytest-keep-together last release: Dec 07, 2022, status: 5 - Production/Stable, requires: pytest Pytest plugin to customize test ordering by running all 'related' tests together pytest-kexi last release: Apr 29, 2022, status: N/A, requires: pytest (>=7.1.2,<8.0.0) pytest-keyring last release: Oct 01, 2023, status: N/A, requires: pytest (>=7.1) A Pytest plugin to access the system's keyring to provide credentials for tests pytest-kind last release: Nov 30, 2022, status: 5 - Production/Stable, requires: N/A Kubernetes test support with KIND for pytest pytest-kivy last release: Jul 06, 2021, status: 4 - Beta, requires: pytest (>=3.6) Kivy GUI tests fixtures using pytest pytest-knows last release: Aug 22, 2014, status: N/A, requires: N/A A pytest plugin that can automaticly skip test case based on dependence info calculated by trace pytest-konira last release: Oct 09, 2011, status: N/A, requires: N/A Run Konira DSL tests with py.test pytest-kookit last release: May 16, 2024, status: N/A, requires: N/A Your simple but kooky integration testing with pytest pytest-koopmans last release: Nov 21, 2022, status: 4 - Beta, requires: pytest (>=3.5.0) A plugin for testing the koopmans package pytest-krtech-common last release: Nov 28, 2016, status: 4 - Beta, requires: N/A pytest krtech common library pytest-kubernetes last release: Sep 14, 2023, status: N/A, requires: pytest (>=7.2.1,<8.0.0) pytest-kuunda

last release: Feb 25, 2024, status: 4 - Beta, requires: pytest >=6.2.0

pytest plugin to help with test data setup for PySpark tests

```
pytest-kwparametrize
      last release: Jan 22, 2021, status: N/A, requires: pytest (>=6)
      Alternate syntax for @pytest.mark.parametrize with test cases as dictionaries and default value fallbacks
pytest-lambda
      last release: May 27, 2024, status: 5 - Production/Stable, requires: pytest<9,>=3.6
      Define pytest fixtures with lambda functions.
pytest-lamp
      last release: Jan 06, 2017, status: 3 - Alpha, requires: N/A
pytest-langchain
      last release: Feb 26, 2023, status: N/A, requires: pytest
      Pytest-style test runner for langehain agents
pytest-lark
      last release: Nov 05, 2023, status: N/A, requires: N/A
      Create fancy and clear HTML test reports.
pytest-launchable
      last release: Apr 05, 2023, status: N/A, requires: pytest (>=4.2.0)
      Launchable Pytest Plugin
pytest-layab
      last release: Oct 05, 2020, status: 5 - Production/Stable, requires: N/A
      Pytest fixtures for layab.
pytest-lazy-fixture
      last release: Feb 01, 2020, status: 4 - Beta, requires: pytest (>=3.2.5)
      It helps to use fixtures in pytest.mark.parametrize
pytest-lazy-fixtures
      last release: Jul 22, 2024, status: N/A, requires: pytest>=7
      Allows you to use fixtures in @pytest.mark.parametrize.
pytest-ldap
      last release: Aug 18, 2020, status: N/A, requires: pytest
      python-ldap fixtures for pytest
pytest-leak-finder
      last release: Feb 15, 2023, status: 4 - Beta, requires: pytest (>=3.5.0)
      Find the test that's leaking before the one that fails
pytest-leaks
      last release: Nov 27, 2019, status: 1 - Planning, requires: N/A
      A pytest plugin to trace resource leaks.
pytest-leaping
      last release: Mar 27, 2024, status: 4 - Beta, requires: pytest>=6.2.0
      A simple plugin to use with pytest
pytest-level
      last release: Oct 21, 2019, status: N/A, requires: pytest
```

Select tests of a given level or lower

pytest-libfaketime last release: Apr 12, 2024, status: 4 - Beta, requires: pytest>=3.0.0 A python-libfaketime plugin for pytest pytest-libiio last release: Dec 22, 2023, status: 4 - Beta, requires: N/A A pytest plugin to manage interfacing with libiio contexts pytest-libnotify last release: Apr 02, 2021, status: 3 - Alpha, requires: pytest Pytest plugin that shows notifications about the test run pytest-ligo last release: Jan 16, 2020, status: 4 - Beta, requires: N/A pytest-lineno last release: Dec 04, 2020, status: N/A, requires: pytest A pytest plugin to show the line numbers of test functions pytest-line-profiler last release: Aug 10, 2023, status: 4 - Beta, requires: pytest >=3.5.0 Profile code executed by pytest pytest-line-profiler-apn last release: Dec 05, 2022, status: N/A, requires: pytest (>=3.5.0) Profile code executed by pytest pytest-lisa last release: Jan 21, 2021, status: 3 - Alpha, requires: pytest (>=6.1.2,<7.0.0) Pytest plugin for organizing tests. pytest-listener last release: May 28, 2019, status: 5 - Production/Stable, requires: pytest A simple network listener pytest-litf last release: Jan 18, 2021, status: 4 - Beta, requires: pytest (>=3.1.1) A pytest plugin that stream output in LITF format pytest-litter last release: Nov 23, 2023, status: 4 - Beta, requires: pytest >=6.1 Pytest plugin which verifies that tests do not modify file trees. pytest-live last release: Mar 08, 2020, status: N/A, requires: pytest Live results for pytest pytest-local-badge last release: Jan 15, 2023, status: N/A, requires: pytest (>=6.1.0) Generate local badges (shields) reporting your test suite status. pytest-localftpserver

last release: May 19, 2024, status: 5 - Production/Stable, requires: pytest

A PyTest plugin which provides an FTP fixture for your tests

3.2. Pytest Plugin List

pytest-localserver

last release: Aug 17, 2024, status: 4 - Beta, requires: N/A

pytest plugin to test server connections locally.

pytest-localstack

last release: Jun 07, 2023, status: 4 - Beta, requires: pytest (>=6.0.0,<7.0.0)

Pytest plugin for AWS integration tests

pytest-lock

last release: Feb 03, 2024, *status*: N/A, *requires*: pytest (>=7.4.3,<8.0.0)

pytest-lock is a pytest plugin that allows you to "lock" the results of unit tests, storing them in a local cache. This is particularly useful for tests that are resource-intensive or don't need to be run every time. When the tests are run subsequently, pytest-lock will compare the current results with the locked results and issue a warning if there are any discrepancies.

pytest-lockable

last release: Jan 24, 2024, status: 5 - Production/Stable, requires: pytest

lockable resource plugin for pytest

pytest-locker

last release: Oct 29, 2021, status: N/A, requires: pytest (>=5.4)

Used to lock object during testing. Essentially changing assertions from being hard coded to asserting that nothing changed

pytest-log

last release: Aug 15, 2021, status: N/A, requires: pytest (>=3.8)

print log

pytest-logbook

last release: Nov 23, 2015, status: 5 - Production/Stable, requires: pytest (>=2.8)

py.test plugin to capture logbook log messages

pytest-logdog

last release: Jun 15, 2021, status: 1 - Planning, requires: pytest (>=6.2.0)

Pytest plugin to test logging

pytest-logfest

last release: Jul 21, 2019, status: 4 - Beta, requires: pytest (>=3.5.0)

Pytest plugin providing three logger fixtures with basic or full writing to log files

pytest-logger

last release: Mar 10, 2024, status: 5 - Production/Stable, requires: pytest (>=3.2)

Plugin configuring handlers for loggers from Python logging module.

pytest-logging

last release: Nov 04, 2015, status: 4 - Beta, requires: N/A

Configures logging and allows tweaking the log level with a py.test flag

pytest-logging-end-to-end-test-tool

last release: Sep 23, 2022, *status*: N/A, *requires*: pytest (>=7.1.2,<8.0.0)

pytest-logikal

last release: Aug 30, 2024, status: 5 - Production/Stable, requires: pytest==8.3.2

Common testing environment

pytest-log-report

last release: Dec 26, 2019, status: N/A, requires: N/A

Package for creating a pytest test run reprot

pytest-logscanner

last release: Jul 19, 2024, status: 4 - Beta, requires: N/A

Pytest plugin for logscanner (A logger for python logging outputting to easily viewable (and filterable) html files. Good for people not grep savey, and color highlighting and quickly changing filters might even bye useful for commandline wizards.)

pytest-loguru

last release: Mar 20, 2024, status: 5 - Production/Stable, requires: pytest; extra == "test"

Pytest Loguru

pytest-loop

last release: Mar 30, 2024, status: 5 - Production/Stable, requires: pytest

pytest plugin for looping tests

pytest-lsp

last release: Aug 28, 2024, status: 3 - Alpha, requires: pytest

A pytest plugin for end-to-end testing of language servers

pytest-manual-marker

last release: Aug 04, 2022, status: 3 - Alpha, requires: pytest>=7

pytest marker for marking manual tests

pytest-markdoctest

last release: Jul 22, 2022, status: 4 - Beta, requires: pytest (>=6)

A pytest plugin to doctest your markdown files

pytest-markdown

last release: Jan 15, 2021, status: 4 - Beta, requires: pytest (>=6.0.1,<7.0.0)

Test your markdown docs with pytest

pytest-markdown-docs

last release: Mar 05, 2024, status: N/A, requires: pytest (>=7.0.0)

Run markdown code fences through pytest

pytest-marker-bugzilla

last release: Jan 09, 2020, status: N/A, requires: N/A

py.test bugzilla integration plugin, using markers

pytest-markers-presence

last release: Feb 04, 2021, status: 4 - Beta, requires: pytest (>=6.0)

A simple plugin to detect missed pytest tags and markers"

pytest-markfiltration

last release: Nov 08, 2011, status: 3 - Alpha, requires: N/A

UNKNOWN

pytest-mark-manage

last release: Aug 15, 2024, status: N/A, requires: pytest

用例标签化管理

```
pvtest-mark-no-pv3
      last release: May 17, 2019, status: N/A, requires: pytest
      pytest plugin and bowler codemod to help migrate tests to Python 3
pytest-marks
      last release: Nov 23, 2012, status: 3 - Alpha, requires: N/A
      UNKNOWN
pytest-mask-secrets
      last release: Aug 06, 2024, status: N/A, requires: N/A
      Pytest plugin to hide sensitive data in test reports
pytest-matcher
      last release: Aug 01, 2024, status: 5 - Production/Stable, requires: pytest
      Easy way to match captured 'pytest' output against expectations stored in files
pytest-matchers
      last release: Aug 26, 2024, status: N/A, requires: pytest<9.0,>=7.0
      Matchers for pytest
pytest-match-skip
      last release: May 15, 2019, status: 4 - Beta, requires: pytest (>=4.4.1)
      Skip matching marks. Matches partial marks using wildcards.
pytest-mat-report
      last release: Jan 20, 2021, status: N/A, requires: N/A
      this is report
pytest-matrix
      last release: Jun 24, 2020, status: 5 - Production/Stable, requires: pytest (>=5.4.3,<6.0.0)
      Provide tools for generating tests from combinations of fixtures.
pytest-maxcov
      last release: Sep 24, 2023, status: N/A, requires: pytest (>=7.4.0,<8.0.0)
      Compute the maximum coverage available through pytest with the minimum execution time cost
pytest-maybe-context
      last release: Apr 16, 2023, status: N/A, requires: pytest (>=7,<8)
      Simplify tests with warning and exception cases.
pytest-maybe-raises
      last release: May 27, 2022, status: N/A, requires: pytest; extra == 'dev'
      Pytest fixture for optional exception testing.
pytest-mccabe
      last release: Jul 22, 2020, status: 3 - Alpha, requires: pytest (>=5.4.0)
      pytest plugin to run the mccabe code complexity checker.
pytest-md
      last release: Jul 11, 2019, status: 3 - Alpha, requires: pytest (>=4.2.1)
```

Plugin for generating Markdown reports for pytest results

pytest-md-report last release: May 18, 2024, status: 4 - Beta, requires: pytest!=6.0.0,<9,>=3.3.2 A pytest plugin to generate test outcomes reports with markdown table format. pytest-meilisearch last release: Aug 27, 2024, status: N/A, requires: pytest>=7.4.3 Pytest helpers for testing projects using Meilisearch pytest-memlog *last release*: May 03, 2023, *status*: N/A, *requires*: pytest (>=7.3.0,<8.0.0) Log memory usage during tests pytest-memprof last release: Mar 29, 2019, status: 4 - Beta, requires: N/A Estimates memory consumption of test functions pytest-memray last release: Jul 25, 2024, status: N/A, requires: pytest>=7.2 A simple plugin to use with pytest pytest-menu last release: Oct 04, 2017, status: 3 - Alpha, requires: pytest (>=2.4.2) A pytest plugin for console based interactive test selection just after the collection phase pytest-mercurial last release: Nov 21, 2020, status: 1 - Planning, requires: N/A pytest plugin to write integration tests for projects using Mercurial Python internals pytest-mesh last release: Aug 05, 2022, status: N/A, requires: pytest (==7.1.2) pytest_mesh插件 pytest-message last release: Aug 04, 2022, status: N/A, requires: pytest (>=6.2.5) Pytest plugin for sending report message of marked tests execution pytest-messenger last release: Nov 24, 2022, status: 5 - Production/Stable, requires: N/A Pytest to Slack reporting plugin pytest-metadata last release: Feb 12, 2024, status: 5 - Production/Stable, requires: pytest>=7.0.0 pytest plugin for test session metadata pytest-metrics last release: Apr 04, 2020, status: N/A, requires: pytest Custom metrics report for pytest

Pytest multihost plugin

last release: Aug 02, 2024, status: N/A, requires: pytest

pytest-mh

```
pytest-mimesis
      last release: Mar 21, 2020, status: 5 - Production/Stable, requires: pytest (>=4.2)
      Mimesis integration with the pytest test runner
pytest-minecraft
      last release: Apr 06, 2022, status: N/A, requires: pytest (>=6.0.1)
      A pytest plugin for running tests against Minecraft releases
pytest-mini
      last release: Feb 06, 2023, status: N/A, requires: pytest (>=7.2.0,<8.0.0)
      A plugin to test mp
pytest-minio-mock
      last release: Aug 27, 2024, status: N/A, requires: pytest>=5.0.0
      A pytest plugin for mocking Minio S3 interactions
pytest-missing-fixtures
      last release: Oct 14, 2020, status: 4 - Beta, requires: pytest (>=3.5.0)
      Pytest plugin that creates missing fixtures
pytest-missing-modules
      last release: Aug 26, 2024, status: N/A, requires: pytest>=8.3.2
      Pytest plugin to easily fake missing modules
pytest-mitmproxy
      last release: May 28, 2024, status: N/A, requires: pytest>=7.0
      pytest plugin for mitmproxy tests
pytest-ml
      last release: May 04, 2019, status: 4 - Beta, requires: N/A
      Test your machine learning!
pytest-mocha
      last release: Apr 02, 2020, status: 4 - Beta, requires: pytest (>=5.4.0)
      pytest plugin to display test execution output like a mochajs
pytest-mock
      last release: Mar 21, 2024, status: 5 - Production/Stable, requires: pytest>=6.2.5
      Thin-wrapper around the mock package for easier use with pytest
pytest-mock-api
      last release: Feb 13, 2019, status: 1 - Planning, requires: pytest (>=4.0.0)
      A mock API server with configurable routes and responses available as a fixture.
pytest-mock-generator
      last release: May 16, 2022, status: 5 - Production/Stable, requires: N/A
      A pytest fixture wrapper for https://pypi.org/project/mock-generator
pytest-mock-helper
      last release: Jan 24, 2018, status: N/A, requires: pytest
```

Help you mock HTTP call and generate mock code

pytest-mockito

last release: Jul 11, 2018, status: 4 - Beta, requires: N/A

Base fixtures for mockito

pytest-mockredis

last release: Jan 02, 2018, status: 2 - Pre-Alpha, requires: N/A

An in-memory mock of a Redis server that runs in a separate thread. This is to be used for unit-tests that require a Redis database.

pytest-mock-resources

last release: Jun 20, 2024, status: N/A, requires: pytest>=1.0

A pytest plugin for easily instantiating reproducible mock resources.

pytest-mock-server

last release: Jan 09, 2022, status: 4 - Beta, requires: pytest (>=3.5.0)

Mock server plugin for pytest

pytest-mockservers

last release: Mar 31, 2020, status: N/A, requires: pytest (>=4.3.0)

A set of fixtures to test your requests to HTTP/UDP servers

pytest-mocktcp

last release: Oct 11, 2022, status: N/A, requires: pytest

A pytest plugin for testing TCP clients

pytest-modalt

last release: Feb 27, 2024, status: 4 - Beta, requires: pytest >=6.2.0

Massively distributed pytest runs using modal.com

pytest-modified-env

last release: Jan 29, 2022, status: 4 - Beta, requires: N/A

Pytest plugin to fail a test if it leaves modified 'os.environ' afterwards.

pytest-modifyjunit

last release: Jan 10, 2019, status: N/A, requires: N/A

Utility for adding additional properties to junit xml for IDM QE

pytest-molecule

last release: Mar 29, 2022, status: 5 - Production/Stable, requires: pytest (>=7.0.0)

PyTest Molecule Plugin :: discover and run molecule tests

pytest-molecule-JC

last release: Jul 18, 2023, status: 5 - Production/Stable, requires: pytest (>=7.0.0)

PyTest Molecule Plugin :: discover and run molecule tests

pytest-mongo

last release: Mar 13, 2024, status: 5 - Production/Stable, requires: pytest >=6.2

MongoDB process and client fixtures plugin for Pytest.

pytest-mongodb

last release: May 16, 2023, status: 5 - Production/Stable, requires: N/A

pytest plugin for MongoDB fixtures

```
pytest-monitor
      last release: Jun 25, 2023, status: 5 - Production/Stable, requires: pytest
      Pytest plugin for analyzing resource usage.
pytest-monkeyplus
      last release: Sep 18, 2012, status: 5 - Production/Stable, requires: N/A
      pytest's monkeypatch subclass with extra functionalities
pytest-monkeytype
      last release: Jul 29, 2020, status: 4 - Beta, requires: N/A
      pytest-monkeytype: Generate Monkeytype annotations from your pytest tests.
pytest-moto
      last release: Aug 28, 2015, status: 1 - Planning, requires: N/A
      Fixtures for integration tests of AWS services, uses moto mocking library.
pytest-motor
      last release: Jul 21, 2021, status: 3 - Alpha, requires: pytest
      A pytest plugin for motor, the non-blocking MongoDB driver.
pytest-mp
      last release: May 23, 2018, status: 4 - Beta, requires: pytest
      A test batcher for multiprocessed Pytest runs
pytest-mpi
      last release: Jan 08, 2022, status: 3 - Alpha, requires: pytest
      pytest plugin to collect information from tests
pytest-mpiexec
      last release: Jul 29, 2024, status: 3 - Alpha, requires: pytest
      pytest plugin for running individual tests with mpiexec
pytest-mpl
      last release: Feb 14, 2024, status: 4 - Beta, requires: pytest
      pytest plugin to help with testing figures output from Matplotlib
pytest-mproc
```

last release: Nov 15, 2022, status: 4 - Beta, requires: pytest (>=6)

low-startup-overhead, scalable, distributed-testing pytest plugin

pytest-mqtt

last release: Jul 29, 2024, status: 4 - Beta, requires: pytest<9; extra == "test"

pytest-mqtt supports testing systems based on MQTT

pytest-multihost

last release: Apr 07, 2020, status: 4 - Beta, requires: N/A

Utility for writing multi-host tests for pytest

pytest-multilog

last release: Jan 17, 2023, status: N/A, requires: pytest Multi-process logs handling and other helpers for pytest

```
pytest-multithreading
      last release: Aug 05, 2024, status: N/A, requires: N/A
      a pytest plugin for th and concurrent testing
pytest-multithreading-allure
      last release: Nov 25, 2022, status: N/A, requires: N/A
      pytest_multithreading_allure
pytest-mutagen
      last release: Jul 24, 2020, status: N/A, requires: pytest (>=5.4)
      Add the mutation testing feature to pytest
pvtest-mv-cool-lib
      last release: Nov 02, 2023, status: N/A, requires: pytest (>=7.1.3,<8.0.0)
pytest-mypy
      last release: Dec 18, 2022, status: 4 - Beta, requires: pytest (>=6.2); python_version >= "3.10"
      Mypy static type checker plugin for Pytest
pytest-mypyd
      last release: Aug 20, 2019, status: 4 - Beta, requires: pytest (<4.7,>=2.8); python_version < "3.5"
      Mypy static type checker plugin for Pytest
pytest-mypy-plugins
      last release: Mar 31, 2024, status: 4 - Beta, requires: pytest>=7.0.0
      pytest plugin for writing tests for mypy plugins
pytest-mypy-plugins-shim
      last release: Apr 12, 2021, status: N/A, requires: pytest>=6.0.0
      Substitute for "pytest-mypy-plugins" for Python implementations which aren't supported by mypy.
pytest-mypy-runner
      last release: Apr 23, 2024, status: N/A, requires: pytest>=8.0
      Run the mypy static type checker as a pytest test case
pytest-mypy-testing
      last release: Mar 04, 2024, status: N/A, requires: pytest>=7,<9
      Pytest plugin to check mypy output.
pytest-mysql
      last release: May 23, 2024, status: 5 - Production/Stable, requires: pytest>=6.2
      MySQL process and client fixtures for pytest
pytest-ndb
      last release: Apr 28, 2024, status: N/A, requires: pytest
      pytest notebook debugger
pytest-needle
      last release: Dec 10, 2018, status: 4 - Beta, requires: pytest (<5.0.0,>=3.0.0)
      pytest plugin for visual testing websites using selenium
pytest-neo
      last release: Jan 08, 2022, status: 3 - Alpha, requires: pytest (>=6.2.0)
      pytest-neo is a plugin for pytest that shows tests like screen of Matrix.
```

```
pvtest-neos
      last release: Jun 11, 2024, status: 1 - Planning, requires: N/A
      Pytest plugin for neos
pytest-netconf
      last release: Aug 08, 2024, status: N/A, requires: N/A
      A pytest plugin that provides a mock NETCONF (RFC6241/RFC6242) server for local testing.
pytest-netdut
      last release: Jul 05, 2024, status: N/A, requires: pytest<7.3,>=3.5.0
      "Automated software testing for switches using pytest"
pytest-network
      last release: May 07, 2020, status: N/A, requires: N/A
      A simple plugin to disable network on socket level.
pytest-network-endpoints
      last release: Mar 06, 2022, status: N/A, requires: pytest
      Network endpoints plugin for pytest
pytest-never-sleep
      last release: May 05, 2021, status: 3 - Alpha, requires: pytest (>=3.5.1)
      pytest plugin helps to avoid adding tests without mock 'time.sleep'
pytest-nginx
      last release: Aug 12, 2017, status: 5 - Production/Stable, requires: N/A
      nginx fixture for pytest
pytest-nginx-iplweb
      last release: Mar 01, 2019, status: 5 - Production/Stable, requires: N/A
      nginx fixture for pytest - iplweb temporary fork
pytest-ngrok
      last release: Jan 20, 2022, status: 3 - Alpha, requires: pytest
pytest-ngsfixtures
      last release: Sep 06, 2019, status: 2 - Pre-Alpha, requires: pytest (>=5.0.0)
      pytest ngs fixtures
pytest-nhsd-apim
      last release: Jul 01, 2024, status: N/A, requires: pytest<9.0.0,>=8.2.0
      Pytest plugin accessing NHSDigital's APIM proxies
pytest-nice
      last release: May 04, 2019, status: 4 - Beta, requires: pytest
      A pytest plugin that alerts user of failed test cases with screen notifications
pytest-nice-parametrize
      last release: Apr 17, 2021, status: 5 - Production/Stable, requires: N/A
      A small snippet for nicer PyTest's Parametrize
pytest_nlcov
      last release: Aug 05, 2024, status: N/A, requires: N/A
```

Pytest plugin to get the coverage of the new lines (based on git diff) only

pytest-nocustom

last release: Aug 05, 2024, status: 5 - Production/Stable, requires: N/A

Run all tests without custom markers

pytest-node-dependency

last release: Apr 10, 2024, status: 5 - Production/Stable, requires: N/A

pytest plugin for controlling execution flow

pytest-nodev

last release: Jul 21, 2016, status: 4 - Beta, requires: pytest (>=2.8.1)

Test-driven source code search for Python.

pytest-nogarbage

last release: Aug 29, 2021, status: 5 - Production/Stable, requires: pytest (>=4.6.0)

Ensure a test produces no garbage

pytest-nose-attrib

last release: Aug 13, 2023, status: N/A, requires: N/A

pytest plugin to use nose @attrib marks decorators and pick tests based on attributes and partially uses nose-attrib plugin approach

pytest notebook

last release: Nov 28, 2023, status: 4 - Beta, requires: pytest>=3.5.0

A pytest plugin for testing Jupyter Notebooks.

pytest-notice

last release: Nov 05, 2020, status: N/A, requires: N/A

Send pytest execution result email

pytest-notification

last release: Jun 19, 2020, status: N/A, requires: pytest (>=4)

A pytest plugin for sending a desktop notification and playing a sound upon completion of tests

pytest-notifier

last release: Jun 12, 2020, status: 3 - Alpha, requires: pytest

A pytest plugin to notify test result

pytest_notify

last release: Jul 05, 2017, status: N/A, requires: pytest>=3.0.0

Get notifications when your tests ends

pytest-notimplemented

last release: Aug 27, 2019, status: N/A, requires: pytest (>=5.1,<6.0)

Pytest markers for not implemented features and tests.

pytest-notion

last release: Aug 07, 2019, status: N/A, requires: N/A

A PyTest Reporter to send test runs to Notion.so

pytest-nunit

last release: Feb 26, 2024, status: 5 - Production/Stable, requires: N/A

A pytest plugin for generating NUnit3 test result XML output

```
pytest-oar
      last release: May 02, 2023, status: N/A, requires: pytest>=6.0.1
      PyTest plugin for the OAR testing framework
pytest-object-getter
      last release: Jul 31, 2022, status: 5 - Production/Stable, requires: pytest
      Import any object from a 3rd party module while mocking its namespace on demand.
pytest-ochrus
      last release: Feb 21, 2018, status: 4 - Beta, requires: N/A
      pytest results data-base and HTML reporter
pytest-odc
      last release: Aug 04, 2023, status: 4 - Beta, requires: pytest (>=3.5.0)
      A pytest plugin for simplifying ODC database tests
pytest-odoo
      last release: Jul 06, 2023, status: 4 - Beta, requires: pytest (>=7.2.0)
      py.test plugin to run Odoo tests
pytest-odoo-fixtures
      last release: Jun 25, 2019, status: N/A, requires: N/A
      Project description
pytest-oerp
      last release: Feb 28, 2012, status: 3 - Alpha, requires: N/A
      pytest plugin to test OpenERP modules
pytest-offline
      last release: Mar 09, 2023, status: 1 - Planning, requires: pytest (>=7.0.0,<8.0.0)
pytest-ogsm-plugin
      last release: May 16, 2023, status: N/A, requires: N/A
      针对特定项目定制化插件,优化了pytest报告展示方式,并添加了项目所需特定参数
pytest-ok
      last release: Apr 01, 2019, status: 4 - Beta, requires: N/A
      The ultimate pytest output plugin
pytest-only
      last release: May 27, 2024, status: 5 - Production/Stable, requires: pytest<9,>=3.6.0
      Use @pytest.mark.only to run a single test
pytest-oof
      last release: Dec 11, 2023, status: 4 - Beta, requires: N/A
      A Pytest plugin providing structured, programmatic access to a test run's results
pytest-oot
      last release: Sep 18, 2016, status: 4 - Beta, requires: N/A
      Run object-oriented tests in a simple format
pytest-openfiles
      last release: Jun 05, 2024, status: 3 - Alpha, requires: pytest>=4.6
```

Pytest plugin for detecting inadvertent open file handles

pytest-opentelemetry last release: Oct 01, 2023, status: N/A, requires: pytest A pytest plugin for instrumenting test runs via OpenTelemetry pytest-opentmi last release: Jun 02, 2022, status: 5 - Production/Stable, requires: pytest (>=5.0) pytest plugin for publish results to opentmi pytest-operator last release: Sep 28, 2022, status: N/A, requires: pytest Fixtures for Operators pytest-optional last release: Oct 07, 2015, status: N/A, requires: N/A include/exclude values of fixtures in pytest pytest-optional-tests last release: Jul 09, 2019, status: 4 - Beta, requires: pytest (>=4.5.0) Easy declaration of optional tests (i.e., that are not run by default) pytest-orchestration last release: Jul 18, 2019, status: N/A, requires: N/A A pytest plugin for orchestrating tests pytest-order last release: Aug 22, 2024, status: 5 - Production/Stable, requires: pytest>=5.0; python_version < "3.10" pytest plugin to run your tests in a specific order pytest-ordering last release: Nov 14, 2018, status: 4 - Beta, requires: pytest pytest plugin to run your tests in a specific order pytest-order-modify last release: Nov 04, 2022, status: N/A, requires: N/A 新增run marker 来自定义用例的执行顺序 pytest-osxnotify last release: May 15, 2015, status: N/A, requires: N/A OS X notifications for py.test results. pytest-ot last release: Mar 21, 2024, status: N/A, requires: pytest; extra == "dev"

A pytest plugin for instrumenting test runs via OpenTelemetry

pytest-otel

last release: Mar 18, 2024, status: N/A, requires: pytest==8.1.1

OpenTelemetry plugin for Pytest

pytest-override-env-var

last release: Feb 25, 2023, status: N/A, requires: N/A

Pytest mark to override a value of an environment variable.

pytest-owner

last release: Aug 19, 2024, status: N/A, requires: pytest

Add owner mark for tests

pytest-pact

last release: Jan 07, 2019, status: 4 - Beta, requires: N/A

A simple plugin to use with pytest

pytest-pahrametahrize

last release: Nov 24, 2021, status: 4 - Beta, requires: pytest (>=6.0,<7.0)

Parametrize your tests with a Boston accent.

pytest-parallel

last release: Oct 10, 2021, status: 3 - Alpha, requires: pytest (>=3.0.0)

a pytest plugin for parallel and concurrent testing

pytest-parallel-39

last release: Jul 12, 2021, status: 3 - Alpha, requires: pytest (>=3.0.0)

a pytest plugin for parallel and concurrent testing

pytest-parallelize-tests

last release: Jan 27, 2023, status: 4 - Beta, requires: N/A

pytest plugin that parallelizes test execution across multiple hosts

pytest-param

last release: Sep 11, 2016, status: 4 - Beta, requires: pytest (>=2.6.0)

pytest plugin to test all, first, last or random params

pytest-paramark

last release: Jan 10, 2020, status: 4 - Beta, requires: pytest (>=4.5.0)

Configure pytest fixtures using a combination of "parametrize" and markers

pytest-parametrization

last release: May 22, 2022, status: 5 - Production/Stable, requires: N/A

Simpler PyTest parametrization

pytest-parametrize-cases

last release: Mar 13, 2022, status: N/A, requires: pytest (>=6.1.2)

A more user-friendly way to write parametrized tests.

pytest-parametrized

last release: Nov 03, 2023, status: 5 - Production/Stable, requires: pytest

Pytest decorator for parametrizing tests with default iterables.

pytest-parametrize-suite

last release: Jan 19, 2023, status: 5 - Production/Stable, requires: pytest

A simple pytest extension for creating a named test suite.

pytest_param_files

last release: Jul 29, 2023, status: N/A, requires: pytest

Create pytest parametrize decorators from external files.

```
pytest-params
      last release: Aug 05, 2024, status: N/A, requires: pytest>=7.0.0
      Simplified pytest test case parameters.
pytest-param-scope
      last release: Oct 18, 2023, status: N/A, requires: pytest
      pytest parametrize scope fixture workaround
pytest-parawtf
      last release: Dec 03, 2018, status: 4 - Beta, requires: pytest (>=3.6.0)
      Finally spell paramete?ri[sz]e correctly
pytest-pass
      last release: Dec 04, 2019, status: N/A, requires: N/A
      Check out https://github.com/elilutsky/pytest-pass
pytest-passrunner
      last release: Feb 10, 2021, status: 5 - Production/Stable, requires: pytest (>=4.6.0)
      Pytest plugin providing the 'run_on_pass' marker
pytest-paste-config
      last release: Sep 18, 2013, status: 3 - Alpha, requires: N/A
      Allow setting the path to a paste config file
pytest-patch
      last release: Apr 29, 2023, status: 3 - Alpha, requires: pytest (>=7.0.0)
      An automagic `patch` fixture that can patch objects directly or by name.
pytest-patches
      last release: Aug 30, 2021, status: 4 - Beta, requires: pytest (>=3.5.0)
      A contextmanager pytest fixture for handling multiple mock patches
pytest-patterns
      last release: Jun 14, 2024, status: 4 - Beta, requires: N/A
      pytest plugin to make testing complicated long string output easy to write and easy to debug
pytest-pdb
      last release: Jul 31, 2018, status: N/A, requires: N/A
      pytest plugin which adds pdb helper commands related to pytest.
pytest-peach
      last release: Apr 12, 2019, status: 4 - Beta, requires: pytest (>=2.8.7)
      pytest plugin for fuzzing with Peach API Security
pytest-pep257
      last release: Jul 09, 2016, status: N/A, requires: N/A
      py.test plugin for pep257
pytest-pep8
      last release: Apr 27, 2014, status: N/A, requires: N/A
      pytest plugin to check PEP8 requirements
```

pytest-percent

last release: May 21, 2020, status: N/A, requires: pytest (>=5.2.0)

Change the exit code of pytest test sessions when a required percent of tests pass.

pytest-percents

last release: Mar 16, 2024, status: N/A, requires: N/A

pytest-perf

last release: May 20, 2024, status: 5 - Production/Stable, requires: pytest!=8.1.*,>=6; extra == "testing"

Run performance tests against the mainline code.

pytest-performance

last release: Sep 11, 2020, status: 5 - Production/Stable, requires: pytest (>=3.7.0)

A simple plugin to ensure the execution of critical sections of code has not been impacted

pytest-performancetotal

last release: Mar 19, 2024, status: 4 - Beta, requires: N/A

A performance plugin for pytest

pytest-persistence

last release: Aug 21, 2024, status: N/A, requires: N/A

Pytest tool for persistent objects

pytest-pexpect

last release: Aug 13, 2024, status: 4 - Beta, requires: pytest>=6.2.0

Pytest pexpect plugin.

pytest-pg

last release: May 21, 2024, status: 5 - Production/Stable, requires: pytest>=6.0.0

A tiny plugin for pytest which runs PostgreSQL in Docker

pytest-pgsql

last release: May 13, 2020, status: 5 - Production/Stable, requires: pytest (>=3.0.0)

Pytest plugins and helpers for tests using a Postgres database.

pytest-phmdoctest

last release: Apr 15, 2022, status: 4 - Beta, requires: pytest (>=5.4.3)

pytest plugin to test Python examples in Markdown using phmdoctest.

pytest-picked

last release: Jul 27, 2023, status: N/A, requires: pytest (>=3.7.0)

Run the tests related to the changed files

pytest-pigeonhole

last release: Jun 25, 2018, status: 5 - Production/Stable, requires: pytest (>=3.4)

pytest-pikachu

last release: Aug 05, 2021, status: 5 - Production/Stable, requires: pytest

Show surprise when tests are passing

pytest-pilot

last release: Oct 09, 2020, status: 5 - Production/Stable, requires: N/A

Slice in your test base thanks to powerful markers.

pytest-pingguo-pytest-plugin last release: Oct 26, 2022, status: 4 - Beta, requires: N/A pingguo test pytest-pings last release: Jun 29, 2019, status: 3 - Alpha, requires: pytest (>=5.0.0) The pytest plugin for Firefox Telemetry pytest-pinned last release: Sep 17, 2021, status: 4 - Beta, requires: pytest (>=3.5.0) A simple pytest plugin for pinning tests pytest-pinpoint last release: Sep 25, 2020, status: N/A, requires: pytest (>=4.4.0) A pytest plugin which runs SBFL algorithms to detect faults. pytest-pipeline last release: Jan 24, 2017, status: 3 - Alpha, requires: N/A Pytest plugin for functional testing of data analysispipelines pytest-pitch last release: Nov 02, 2023, status: 4 - Beta, requires: pytest >=7.3.1 runs tests in an order such that coverage increases as fast as possible pytest-platform-markers last release: Sep 09, 2019, status: 4 - Beta, requires: pytest (>=3.6.0) Markers for pytest to skip tests on specific platforms pytest-play last release: Jun 12, 2019, status: 5 - Production/Stable, requires: N/A pytest plugin that let you automate actions and assertions with test metrics reporting executing plain YAML files pytest-playbook last release: Jan 21, 2021, status: 3 - Alpha, requires: pytest (>=6.1.2,<7.0.0) Pytest plugin for reading playbooks. pytest-playwright last release: Jul 03, 2024, status: N/A, requires: N/A A pytest wrapper with fixtures for Playwright to automate web browsers pytest playwright async last release: May 24, 2024, status: N/A, requires: N/A ASYNC Pytest plugin for Playwright pytest-playwright-asyncio last release: Aug 29, 2023, status: N/A, requires: N/A pytest-playwright-enhanced last release: Mar 24, 2024, status: N/A, requires: pytest<9.0.0,>=8.0.0 A pytest plugin for playwright python pytest-playwrights

last release: Dec 02, 2021, status: N/A, requires: N/A

A pytest wrapper with fixtures for Playwright to automate web browsers

```
pytest-playwright-snapshot
      last release: Aug 19, 2021, status: N/A, requires: N/A
      A pytest wrapper for snapshot testing with playwright
pytest-playwright-visual
      last release: Apr 28, 2022, status: N/A, requires: N/A
      A pytest fixture for visual testing with Playwright
pytest-plone
      last release: May 15, 2024, status: 3 - Alpha, requires: pytest<8.0.0
      Pytest plugin to test Plone addons
pytest-plt
      last release: Jan 17, 2024, status: 5 - Production/Stable, requires: pytest
      Fixtures for quickly making Matplotlib plots in tests
pytest-plugin-helpers
      last release: Nov 23, 2019, status: 4 - Beta, requires: pytest (>=3.5.0)
      A plugin to help developing and testing other plugins
pytest-plus
      last release: Mar 26, 2024, status: 5 - Production/Stable, requires: pytest>=7.4.2
      PyTest Plus Plugin :: extends pytest functionality
pytest-pmisc
      last release: Mar 21, 2019, status: 5 - Production/Stable, requires: N/A
pytest-pogo
      last release: May 22, 2024, status: 1 - Planning, requires: pytest<9,>=7
      Pytest plugin for pogo-migrate
pytest-pointers
      last release: Dec 26, 2022, status: N/A, requires: N/A
      Pytest plugin to define functions you test with special marks for better navigation and reports
pytest-pokie
      last release: Oct 19, 2023, status: 5 - Production/Stable, requires: N/A
      Pokie plugin for pytest
pytest-polarion-cfme
      last release: Nov 13, 2017, status: 3 - Alpha, requires: N/A
      pytest plugin for collecting test cases and recording test results
pytest-polarion-collect
      last release: Jun 18, 2020, status: 3 - Alpha, requires: pytest
      pytest plugin for collecting polarion test cases data
pytest-polecat
      last release: Aug 12, 2019, status: 4 - Beta, requires: N/A
      Provides Polecat pytest fixtures
pytest-ponyorm
      last release: Oct 31, 2018, status: N/A, requires: pytest (>=3.1.1)
      PonyORM in Pytest
```

```
pytest-poo
      last release: Mar 25, 2021, status: 5 - Production/Stable, requires: pytest (>=2.3.4)
      Visualize your crappy tests
pytest-poo-fail
      last release: Feb 12, 2015, status: 5 - Production/Stable, requires: N/A
      Visualize your failed tests with poo
pytest-pook
      last release: Feb 15, 2024, status: 4 - Beta, requires: pytest
      Pytest plugin for pook
pytest-pop
      last release: May 09, 2023, status: 5 - Production/Stable, requires: pytest
      A pytest plugin to help with testing pop projects
pytest-portion
      last release: Jan 28, 2021, status: 4 - Beta, requires: pytest (>=3.5.0)
      Select a portion of the collected tests
pytest-postgres
      last release: Mar 22, 2020, status: N/A, requires: pytest
      Run PostgreSQL in Docker container in Pytest.
pytest-postgresql
      last release: Aug 14, 2024, status: 5 - Production/Stable, requires: pytest>=6.2
      Postgresql fixtures and fixture factories for Pytest.
pytest-power
      last release: Dec 31, 2020, status: N/A, requires: pytest (>=5.4)
      pytest plugin with powerful fixtures
pytest-powerpack
      last release: Mar 17, 2024, status: N/A, requires: pytest (>=8.1.1,<9.0.0)
pytest-prefer-nested-dup-tests
      last release: Apr 27, 2022, status: 4 - Beta, requires: pytest (>=7.1.1,<8.0.0)
      A Pytest plugin to drop duplicated tests during collection, but will prefer keeping nested packages.
pytest-pretty
      last release: Apr 05, 2023, status: 5 - Production/Stable, requires: pytest>=7
      pytest plugin for printing summary data as I want it
pytest-pretty-terminal
      last release: Jan 31, 2022, status: N/A, requires: pytest (>=3.4.1)
      pytest plugin for generating prettier terminal output
pytest-pride
      last release: Apr 02, 2016, status: 3 - Alpha, requires: N/A
      Minitest-style test colors
pytest-print
      last release: Aug 25, 2023, status: 5 - Production/Stable, requires: pytest>=7.4
```

```
pytest-print adds the printer fixture you can use to print messages to the user (directly to the pytest runner, not
      stdout)
pytest-priority
      last release: Aug 19, 2024, status: N/A, requires: pytest
      pytest plugin for add priority for tests
pytest-proceed
      last release: Apr 10, 2024, status: N/A, requires: pytest
pytest-profiles
      last release: Dec 09, 2021, status: 4 - Beta, requires: pytest (>=3.7.0)
      pytest plugin for configuration profiles
pytest-profiling
      last release: May 28, 2019, status: 5 - Production/Stable, requires: pytest
      Profiling plugin for py.test
pytest-progress
      last release: Jun 18, 2024, status: 5 - Production/Stable, requires: pytest>=2.7
      pytest plugin for instant test progress status
pytest-prometheus
      last release: Oct 03, 2017, status: N/A, requires: N/A
      Report test pass / failures to a Prometheus PushGateway
pytest-prometheus-pushgateway
      last release: Sep 27, 2022, status: 5 - Production/Stable, requires: pytest
      Pytest report plugin for Zulip
pytest-prosper
      last release: Sep 24, 2018, status: N/A, requires: N/A
      Test helpers for Prosper projects
pytest-prysk
      last release: Mar 12, 2024, status: 4 - Beta, requires: pytest (>=7.3.2)
      Pytest plugin for prysk
pytest-pspec
      last release: Jun 02, 2020, status: 4 - Beta, requires: pytest (>=3.0.0)
      A rspec format reporter for Python ptest
pytest-psqlgraph
      last release: Oct 19, 2021, status: 4 - Beta, requires: pytest (>=6.0)
      pytest plugin for testing applications that use psqlgraph
pytest-pt
      last release: May 15, 2024, status: 4 - Beta, requires: pytest
      pytest plugin to use *.pt files as tests
pytest-ptera
      last release: Mar 01, 2022, status: N/A, requires: pytest (>=6.2.4,<7.0.0)
      Use ptera probes in tests
```

```
pytest-publish
      last release: Jun 04, 2024, status: N/A, requires: pytest<9.0.0,>=8.0.0
pytest-pudb
      last release: Oct 25, 2018, status: 3 - Alpha, requires: pytest (>=2.0)
      Pytest PuDB debugger integration
pytest-pumpkin-spice
      last release: Sep 18, 2022, status: 4 - Beta, requires: N/A
      A pytest plugin that makes your test reporting pumpkin-spiced
pytest-purkinje
      last release: Oct 28, 2017, status: 2 - Pre-Alpha, requires: N/A
      py.test plugin for purkinje test runner
pytest-pusher
      last release: Jan 06, 2023, status: 5 - Production/Stable, requires: pytest (>=3.6)
      pytest plugin for push report to minio
pytest-py125
      last release: Dec 03, 2022, status: N/A, requires: N/A
pytest-pycharm
      last release: Aug 13, 2020, status: 5 - Production/Stable, requires: pytest (>=2.3)
      Plugin for py.test to enter PyCharm debugger on uncaught exceptions
pytest-pycodestyle
      last release: Oct 28, 2022, status: 3 - Alpha, requires: N/A
      pytest plugin to run pycodestyle
pytest-pydantic-schema-sync
      last release: Aug 29, 2024, status: N/A, requires: pytest>=6
      Pytest plugin to synchronise Pydantic model schemas with JSONSchema files
pytest-pydev
      last release: Nov 15, 2017, status: 3 - Alpha, requires: N/A
      py.test plugin to connect to a remote debug server with PyDev or PyCharm.
pytest-pydocstyle
      last release: Jan 05, 2023, status: 3 - Alpha, requires: N/A
      pytest plugin to run pydocstyle
pytest-pylint
      last release: Oct 06, 2023, status: 5 - Production/Stable, requires: pytest >=7.0
      pytest plugin to check source code with pylint
pytest-pymysql-autorecord
      last release: Sep 02, 2022, status: N/A, requires: N/A
      Record PyMySQL queries and mock with the stored data.
pytest-pyodide
      last release: Jul 23, 2024, status: N/A, requires: pytest
      Pytest plugin for testing applications that use Pyodide
```

pytest-pypi

last release: Mar 04, 2018, status: 3 - Alpha, requires: N/A

Easily test your HTTP library against a local copy of pypi

pytest-pypom-navigation

last release: Feb 18, 2019, status: 4 - Beta, requires: pytest (>=3.0.7)

Core engine for cookiecutter-qa and pytest-play packages

pytest-pyppeteer

last release: Apr 28, 2022, *status*: N/A, *requires*: pytest (>=6.2.5,<7.0.0)

A plugin to run pyppeteer in pytest

pytest-pyq

last release: Mar 10, 2020, status: 5 - Production/Stable, requires: N/A

Pytest fixture "q" for pyq

pytest-pyramid

last release: Oct 11, 2023, status: 5 - Production/Stable, requires: pytest

pytest_pyramid - provides fixtures for testing pyramid applications with pytest test suite

pytest-pyramid-server

last release: May 28, 2019, status: 5 - Production/Stable, requires: pytest

Pyramid server fixture for py.test

pytest-pyreport

last release: May 05, 2024, status: N/A, requires: pytest

PyReport is a lightweight reporting plugin for Pytest that provides concise HTML report

pytest-pyright

last release: Jan 26, 2024, status: 4 - Beta, requires: pytest >=7.0.0

Pytest plugin for type checking code with Pyright

pytest-pyspec

last release: Aug 17, 2024, status: N/A, requires: pytest<9.0.0,>=8.3.2

A plugin that transforms the pytest output into a result similar to the RSpec. It enables the use of docstrings to display results and also enables the use of the prefixes "describe", "with" and "it".

pytest-pystack

last release: Jan 04, 2024, status: N/A, requires: pytest >=3.5.0

Plugin to run pystack after a timeout for a test suite.

pytest-pytestrail

last release: Aug 27, 2020, status: 4 - Beta, requires: pytest (>=3.8.0)

Pytest plugin for interaction with TestRail

pytest-pythonhashseed

last release: Feb 25, 2024, status: 4 - Beta, requires: pytest>=3.0.0

Pytest plugin to set PYTHONHASHSEED env var.

pytest-pythonpath

last release: Feb 10, 2022, status: 5 - Production/Stable, requires: pytest (<7,>=2.5.2)

pytest plugin for adding to the PYTHONPATH from command line or configs.

```
pytest-python-test-engineer-sort
      last release: May 13, 2024, status: N/A, requires: pytest>=6.2.0
      Sort plugin for Pytest
pytest-pytorch
      last release: May 25, 2021, status: 4 - Beta, requires: pytest
      pytest plugin for a better developer experience when working with the PyTorch test suite
pytest-pyvenv
      last release: Feb 27, 2024, status: N/A, requires: pytest; extra == 'test'
      A package for create venv in tests
pytest-pyvista
      last release: Sep 29, 2023, status: 4 - Beta, requires: pytest>=3.5.0
      Pytest-pyvista package
pytest-qanova
      last release: Aug 26, 2024, status: 3 - Alpha, requires: pytest
      A pytest plugin to collect test information
pytest-qaseio
      last release: May 30, 2024, status: 4 - Beta, requires: pytest<9.0.0,>=7.2.2
      Pytest plugin for Qase.io integration
pytest-qasync
      last release: Jul 12, 2021, status: 4 - Beta, requires: pytest (>=5.4.0)
      Pytest support for qasync.
pytest-qatouch
      last release: Feb 14, 2023, status: 4 - Beta, requires: pytest (>=6.2.0)
      Pytest plugin for uploading test results to your QA Touch Testrun.
pytest-qgis
      last release: Jun 14, 2024, status: 5 - Production/Stable, requires: pytest>=6.0
      A pytest plugin for testing QGIS python plugins
pytest-qml
      last release: Dec 02, 2020, status: 4 - Beta, requires: pytest (>=6.0.0)
      Run QML Tests with pytest
pytest-qr
      last release: Nov 25, 2021, status: 4 - Beta, requires: N/A
      pytest plugin to generate test result QR codes
pytest-qt
      last release: Feb 07, 2024, status: 5 - Production/Stable, requires: pytest
      pytest support for PyQt and PySide applications
pytest-qt-app
      last release: Dec 23, 2015, status: 5 - Production/Stable, requires: N/A
      QT app fixture for py.test
```

```
pytest-quarantine
      last release: Nov 24, 2019, status: 5 - Production/Stable, requires: pytest (>=4.6)
      A plugin for pytest to manage expected test failures
pytest-quickcheck
      last release: Nov 05, 2022, status: 4 - Beta, requires: pytest (>=4.0)
      pytest plugin to generate random data inspired by QuickCheck
pytest_quickify
      last release: Jun 14, 2019, status: N/A, requires: pytest
      Run test suites with pytest-quickify.
pytest-rabbitmq
      last release: May 08, 2024, status: 5 - Production/Stable, requires: pytest>=6.2
      RabbitMQ process and client fixtures for pytest
pytest-race
      last release: Jun 07, 2022, status: 4 - Beta, requires: N/A
      Race conditions tester for pytest
pytest-rage
      last release: Oct 21, 2011, status: 3 - Alpha, requires: N/A
      pytest plugin to implement PEP712
pytest-rail
      last release: May 02, 2022, status: N/A, requires: pytest (>=3.6)
      pytest plugin for creating TestRail runs and adding results
pytest-railflow-testrail-reporter
      last release: Jun 29, 2022, status: 5 - Production/Stable, requires: pytest
      Generate json reports along with specified metadata defined in test markers.
pytest-raises
      last release: Apr 23, 2020, status: N/A, requires: pytest (>=3.2.2)
      An implementation of pytest.raises as a pytest.mark fixture
pytest-raisesregexp
      last release: Dec 18, 2015, status: N/A, requires: N/A
      Simple pytest plugin to look for regex in Exceptions
pytest-raisin
      last release: Feb 06, 2022, status: N/A, requires: pytest
      Plugin enabling the use of exception instances with pytest.raises
pytest-random
      last release: Apr 28, 2013, status: 3 - Alpha, requires: N/A
      py.test plugin to randomize tests
pytest-randomly
      last release: Aug 15, 2023, status: 5 - Production/Stable, requires: pytest
```

Pytest plugin to randomly order tests and control random.seed.

pytest-randomness

last release: May 30, 2019, status: 3 - Alpha, requires: N/A

Pytest plugin about random seed management

pytest-random-num

last release: Oct 19, 2020, status: 5 - Production/Stable, requires: N/A

Randomise the order in which pytest tests are run with some control over the randomness

pytest-random-order

last release: Jan 20, 2024, status: 5 - Production/Stable, requires: pytest >=3.0.0

Randomise the order in which pytest tests are run with some control over the randomness

pytest-ranking

last release: Jun 07, 2024, status: 4 - Beta, requires: pytest>=7.4.3

A Pytest plugin for automatically prioritizing/ranking tests to speed up failure detection

pytest-readme

last release: Sep 02, 2022, status: 5 - Production/Stable, requires: N/A

Test your README.md file

pytest-reana

last release: Aug 21, 2024, status: 3 - Alpha, requires: N/A

Pytest fixtures for REANA.

pytest-recorder

last release: Jun 27, 2024, status: N/A, requires: N/A

Pytest plugin, meant to facilitate unit tests writing for tools consumming Web APIs.

pytest-recording

last release: Jul 09, 2024, status: 4 - Beta, requires: pytest>=3.5.0

A pytest plugin that allows you recording of network interactions via VCR.py

pytest-recordings

last release: Aug 13, 2020, status: N/A, requires: N/A

Provides pytest plugins for reporting request/response traffic, screenshots, and more to ReportPortal

pytest-record-video

last release: Aug 15, 2024, status: N/A, requires: N/A

用例执行过程中录制视频

pytest-redis

last release: Jun 19, 2024, status: 5 - Production/Stable, requires: pytest>=6.2

Redis fixtures and fixture factories for Pytest.

pytest-redislite

last release: Apr 05, 2022, status: 4 - Beta, requires: pytest

Pytest plugin for testing code using Redis

pytest-redmine

last release: Mar 19, 2018, status: 1 - Planning, requires: N/A

Pytest plugin for redmine

pytest-ref

last release: Nov 23, 2019, status: 4 - Beta, requires: pytest (>=3.5.0)

A plugin to store reference files to ease regression testing

pytest-reference-formatter

last release: Oct 01, 2019, status: 4 - Beta, requires: N/A

Conveniently run pytest with a dot-formatted test reference.

pytest-regex

last release: May 29, 2023, status: 4 - Beta, requires: pytest (>=3.5.0)

Select pytest tests with regular expressions

pytest-regex-dependency

last release: Jun 12, 2022, status: N/A, requires: pytest

Management of Pytest dependencies via regex patterns

pytest-regressions

last release: Aug 31, 2023, status: 5 - Production/Stable, requires: pytest >=6.2.0

Easy to use fixtures to write regression tests.

pytest-regtest

last release: Feb 26, 2024, status: N/A, requires: pytest>7.2

pytest plugin for snapshot regression testing

pytest-relative-order

last release: May 17, 2021, status: 4 - Beta, requires: N/A

a pytest plugin that sorts tests using "before" and "after" markers

pytest-relative-path

last release: Aug 30, 2024, status: N/A, requires: pytest

Handle relative path in pytest options or ini configs

pytest-relaxed

last release: Mar 29, 2024, status: 5 - Production/Stable, requires: pytest>=7

Relaxed test discovery/organization for pytest

pytest-remfiles

last release: Jul 01, 2019, status: 5 - Production/Stable, requires: N/A

Pytest plugin to create a temporary directory with remote files

pytest-remotedata

last release: Sep 26, 2023, status: 5 - Production/Stable, requires: pytest >=4.6

Pytest plugin for controlling remote data access.

pytest-remote-response

last release: Apr 26, 2023, status: 5 - Production/Stable, requires: pytest (>=4.6)

Pytest plugin for capturing and mocking connection requests.

pytest-remove-stale-bytecode

last release: Jul 07, 2023, status: 4 - Beta, requires: pytest

py.test plugin to remove stale byte code files.

pytest-reorder

last release: May 31, 2018, status: 4 - Beta, requires: pytest

Reorder tests depending on their paths and names.

pytest-repeat

last release: Oct 09, 2023, status: 5 - Production/Stable, requires: pytest

pytest plugin for repeating tests

pytest repeater

last release: Feb 09, 2018, status: 1 - Planning, requires: N/A

py.test plugin for repeating single test multiple times.

pytest-replay

last release: Jan 11, 2024, status: 5 - Production/Stable, requires: pytest

Saves previous test runs and allow re-execute previous pytest runs to reproduce crashes or flaky tests

pytest-repo-health

last release: Apr 17, 2023, status: 3 - Alpha, requires: pytest

A pytest plugin to report on repository standards conformance

pytest-report

last release: May 11, 2016, status: 4 - Beta, requires: N/A

Creates ison report that is compatible with atom.io's linter message format

pytest-reporter

last release: Feb 28, 2024, status: 4 - Beta, requires: pytest

Generate Pytest reports with templates

pytest-reporter-html1

last release: Aug 08, 2024, status: 4 - Beta, requires: N/A

A basic HTML report template for Pytest

pytest-reporter-html-dots

last release: Jan 22, 2023, status: N/A, requires: N/A

A basic HTML report for pytest using Jinja2 template engine.

pytest-reportinfra

last release: Aug 11, 2019, status: 3 - Alpha, requires: N/A

Pytest plugin for reportinfra

pytest-reporting

last release: Oct 25, 2019, status: 4 - Beta, requires: pytest (>=3.5.0)

A plugin to report summarized results in a table format

pytest-reportlog

last release: May 22, 2023, status: 3 - Alpha, requires: pytest

Replacement for the -resultlog option, focused in simplicity and extensibility

pytest-report-me

last release: Dec 31, 2020, status: N/A, requires: pytest

A pytest plugin to generate report.

```
pytest-report-parameters
      last release: Jun 18, 2020, status: 3 - Alpha, requires: pytest (>=2.4.2)
      pytest plugin for adding tests' parameters to junit report
pytest-reportportal
      last release: Mar 27, 2024, status: N/A, requires: pytest>=3.8.0
      Agent for Reporting results of tests to the Report Portal
pytest-report-stream
      last release: Oct 22, 2023, status: 4 - Beta, requires: N/A
      A pytest plugin which allows to stream test reports at runtime
pytest-repo-structure
      last release: Mar 18, 2024, status: 1 - Planning, requires: N/A
      Pytest Repo Structure
pytest-req
      last release: Jul 26, 2024, status: N/A, requires: pytest<9.0.0,>=8.3.1
      pytest requests plugin
pytest-reqs
      last release: May 12, 2019, status: N/A, requires: pytest (>=2.4.2)
      pytest plugin to check pinned requirements
pytest-requests
      last release: Jun 24, 2019, status: 4 - Beta, requires: pytest (>=3.5.0)
      A simple plugin to use with pytest
pytest-requestselapsed
      last release: Aug 14, 2022, status: N/A, requires: N/A
      collect and show http requests elapsed time
pytest-requests-futures
      last release: Jul 06, 2022, status: 5 - Production/Stable, requires: pytest
      Pytest Plugin to Mock Requests Futures
pytest-requires
      last release: Dec 21, 2021, status: 4 - Beta, requires: pytest (>=3.5.0)
      A pytest plugin to elegantly skip tests with optional requirements
pytest-reraise
      last release: Sep 20, 2022, status: 5 - Production/Stable, requires: pytest (>=4.6)
      Make multi-threaded pytest test cases fail when they should
pytest-rerun
      last release: Jul 08, 2019, status: N/A, requires: pytest (>=3.6)
      Re-run only changed files in specified branch
pytest-rerun-all
      last release: Nov 16, 2023, status: 3 - Alpha, requires: pytest (>=7.0.0)
```

Rerun testsuite for a certain time or iterations

pytest-rerunclassfailures last release: Apr 24, 2024, status: 5 - Production/Stable, requires: pytest>=7.2 pytest rerun class failures plugin pytest-rerunfailures last release: Mar 13, 2024, status: 5 - Production/Stable, requires: pytest >=7.2 pytest plugin to re-run tests to eliminate flaky failures pytest-rerunfailures-all-logs last release: Mar 07, 2022, status: 5 - Production/Stable, requires: N/A pytest plugin to re-run tests to eliminate flaky failures pytest-reserial last release: Jul 23, 2024, status: 4 - Beta, requires: pytest Pytest fixture for recording and replaying serial port traffic. pytest-resilient-circuits last release: Jul 16, 2024, status: N/A, requires: pytest~=7.0 Resilient Circuits fixtures for PyTest pytest-resource last release: Nov 14, 2018, status: 4 - Beta, requires: N/A Load resource fixture plugin to use with pytest pytest-resource-path last release: May 01, 2021, status: 5 - Production/Stable, requires: pytest (>=3.5.0) Provides path for uniform access to test resources in isolated directory pytest-resource-usage last release: Nov 06, 2022, status: 5 - Production/Stable, requires: pytest>=7.0.0 Pytest plugin for reporting running time and peak memory usage pytest-responsemock last release: Mar 10, 2022, status: 5 - Production/Stable, requires: N/A Simplified requests calls mocking for pytest pytest-responses last release: Oct 11, 2022, status: N/A, requires: pytest (>=2.5) py.test integration for responses pytest-rest-api *last release*: Aug 08, 2022, *status*: N/A, *requires*: pytest (>=7.1.2,<8.0.0) pytest-restrict last release: Jul 10, 2023, status: 5 - Production/Stable, requires: pytest Pytest plugin to restrict the test types allowed pytest-result-log last release: Jan 10, 2024, status: N/A, requires: pytest>=7.2.0 A pytest plugin that records the start, end, and result information of each use case in a log file

last release: Apr 20, 2023, status: N/A, requires: pytest>=7.3.1

pytest-result-sender

```
pytest-resume
      last release: Apr 22, 2023, status: 4 - Beta, requires: pytest (>=7.0)
      A Pytest plugin to resuming from the last run test
pytest-rethinkdb
      last release: Jul 24, 2016, status: 4 - Beta, requires: N/A
      A RethinkDB plugin for pytest.
pytest-retry
      last release: May 14, 2024, status: N/A, requires: pytest>=7.0.0
      Adds the ability to retry flaky tests in CI environments
pytest-retry-class
      last release: Mar 25, 2023, status: N/A, requires: pytest (>=5.3)
      A pytest plugin to rerun entire class on failure
pytest-reusable-testcases
      last release: Apr 28, 2023, status: N/A, requires: N/A
pytest-reverse
      last release: Jul 10, 2023, status: 5 - Production/Stable, requires: pytest
      Pytest plugin to reverse test order.
pytest-rich
      last release: Mar 03, 2022, status: 4 - Beta, requires: pytest (>=7.0)
      Leverage rich for richer test session output
pytest-richer
      last release: Oct 27, 2023, status: 3 - Alpha, requires: pytest
      Pytest plugin providing a Rich based reporter.
pytest-rich-reporter
      last release: Feb 17, 2022, status: 1 - Planning, requires: pytest (>=5.0.0)
      A pytest plugin using Rich for beautiful test result formatting.
pytest-richtrace
      last release: Jun 20, 2023, status: N/A, requires: N/A
      A pytest plugin that displays the names and information of the pytest hook functions as they are executed.
pytest-ringo
      last release: Sep 27, 2017, status: 3 - Alpha, requires: N/A
      pytest plugin to test webapplications using the Ringo webframework
pytest-rmsis
      last release: Aug 10, 2022, status: N/A, requires: pytest (>=5.3.5)
      Sycronise pytest results to Jira RMsis
pytest-rng
      last release: Aug 08, 2019, status: 5 - Production/Stable, requires: pytest
      Fixtures for seeding tests and making randomness reproducible
pytest-roast
      last release: Nov 09, 2022, status: 5 - Production/Stable, requires: pytest
```

pytest plugin for ROAST configuration override and fixtures

pytest robotframework last release: Aug 21, 2024, status: N/A, requires: pytest<9,>=7 a pytest plugin that can run both python and robotframework tests while generating robot reports for them pytest-rocketchat last release: Apr 18, 2021, status: 5 - Production/Stable, requires: N/A Pytest to Rocket. Chat reporting plugin pytest-rotest last release: Sep 08, 2019, status: N/A, requires: pytest (>=3.5.0) Pytest integration with rotest pytest-rpc last release: Feb 22, 2019, status: 4 - Beta, requires: pytest (~=3.6) Extend py.test for RPC OpenStack testing. pytest-rst last release: Jan 26, 2023, status: N/A, requires: N/A Test code from RST documents with pytest pytest-rt last release: May 05, 2022, status: N/A, requires: N/A pytest data collector plugin for Testgr pytest-rts last release: May 17, 2021, status: N/A, requires: pytest Coverage-based regression test selection (RTS) plugin for pytest pytest-ruff last release: Jul 21, 2024, status: 4 - Beta, requires: pytest>=5 pytest plugin to check ruff requirements. pytest-run-changed last release: Apr 02, 2021, status: 3 - Alpha, requires: pytest Pytest plugin that runs changed tests only pytest-runfailed last release: Mar 24, 2016, status: N/A, requires: N/A implement a -failed option for pytest pytest-run-subprocess last release: Nov 12, 2022, status: 5 - Production/Stable, requires: pytest Pytest Plugin for running and testing subprocesses. pytest-runtime-types last release: Feb 09, 2023, status: N/A, requires: pytest Checks type annotations on runtime while running tests.

last release: Aug 26, 2021, status: N/A, requires: pytest>=5.0.0

Call runtime_xfail() to mark running test as xfail.

pytest-runtime-xfail

```
pvtest-runtime-vovo
      last release: Jun 12, 2023, status: N/A, requires: pytest (>=7.2.0)
      run case mark timeout
pytest-saccharin
      last release: Oct 31, 2022, status: 3 - Alpha, requires: N/A
      pytest-saccharin is a updated fork of pytest-sugar, a plugin for pytest that changes the default look and feel of pytest
      (e.g. progressbar, show tests that fail instantly).
pytest-salt
      last release: Jan 27, 2020, status: 4 - Beta, requires: N/A
      Pytest Salt Plugin
pytest-salt-containers
      last release: Nov 09, 2016, status: 4 - Beta, requires: N/A
      A Pytest plugin that builds and creates docker containers
pytest-salt-factories
      last release: Mar 22, 2024, status: 5 - Production/Stable, requires: pytest>=7.0.0
      Pytest Salt Plugin
pytest-salt-from-filenames
      last release: Jan 29, 2019, status: 4 - Beta, requires: pytest (>=4.1)
      Simple PyTest Plugin For Salt's Test Suite Specifically
pytest-salt-runtests-bridge
      last release: Dec 05, 2019, status: 4 - Beta, requires: pytest (>=4.1)
      Simple PyTest Plugin For Salt's Test Suite Specifically
pytest-sample-argvalues
      last release: May 07, 2024, status: N/A, requires: pytest
      A utility function to help choose a random sample from your argvalues in pytest.
pytest-sanic
      last release: Oct 25, 2021, status: N/A, requires: pytest (>=5.2)
      a pytest plugin for Sanic
pytest-sanity
      last release: Dec 07, 2020, status: N/A, requires: N/A
pytest-sa-pg
      last release: May 14, 2019, status: N/A, requires: N/A
pytest sauce
      last release: Jul 14, 2014, status: 3 - Alpha, requires: N/A
      pytest_sauce provides sane and helpful methods worked out in clearcode to run py.test tests with selenium/saucelabs
pytest-sbase
      last release: Aug 30, 2024, status: 5 - Production/Stable, requires: N/A
      A complete web automation framework for end-to-end testing.
pytest-scenario
      last release: Feb 06, 2017, status: 3 - Alpha, requires: N/A
      pytest plugin for test scenarios
```

pytest-scenario-files

last release: May 19, 2024, status: 5 - Production/Stable, requires: pytest>=7.2.0

A pytest plugin that generates unit test scenarios from data files.

pytest-schedule

last release: Jan 07, 2023, status: 5 - Production/Stable, requires: N/A

The job of test scheduling for humans.

pytest-schema

last release: Feb 16, 2024, status: 5 - Production/Stable, requires: pytest >=3.5.0

& Validate return values against a schema-like object in testing

pytest-screenshot-on-failure

last release: Jul 21, 2023, status: 4 - Beta, requires: N/A

Saves a screenshot when a test case from a pytest execution fails

pytest-scrutinize

last release: Aug 19, 2024, status: 4 - Beta, requires: pytest>=6

Scrutinize your pytest test suites for slow fixtures, tests and more.

pytest-securestore

last release: Nov 08, 2021, status: 4 - Beta, requires: N/A

An encrypted password store for use within pytest cases

pytest-select

last release: Jan 18, 2019, status: 3 - Alpha, requires: pytest (>=3.0)

A pytest plugin which allows to (de-)select tests from a file.

pytest-selenium

last release: Feb 01, 2024, status: 5 - Production/Stable, requires: pytest>=6.0.0

pytest plugin for Selenium

pytest-selenium-auto

last release: Nov 07, 2023, status: N/A, requires: pytest >= 7.0.0

pytest plugin to automatically capture screenshots upon selenium webdriver events

pytest-seleniumbase

last release: Aug 30, 2024, status: 5 - Production/Stable, requires: N/A

A complete web automation framework for end-to-end testing.

pytest-selenium-enhancer

last release: Apr 29, 2022, status: 5 - Production/Stable, requires: N/A

pytest plugin for Selenium

pytest-selenium-pdiff

last release: Apr 06, 2017, status: 2 - Pre-Alpha, requires: N/A

A pytest package implementing perceptualdiff for Selenium tests.

pytest-selfie

last release: Apr 05, 2024, status: N/A, requires: pytest<9.0.0,>=8.0.0

A pytest plugin for selfie snapshot testing.

pytest-send-email last release: Dec 04, 2019, status: N/A, requires: N/A Send pytest execution result email pytest-sentry last release: Apr 25, 2024, status: N/A, requires: pytest A pytest plugin to send testrun information to Sentry.io pytest-sequence-markers last release: May 23, 2023, status: 5 - Production/Stable, requires: N/A Pytest plugin for sequencing markers for execution of tests pytest-server last release: Jun 24, 2024, status: N/A, requires: N/A test server exec cmd pytest-server-fixtures last release: Dec 19, 2023, status: 5 - Production/Stable, requires: pytest Extensible server fixures for py.test pytest-serverless last release: May 09, 2022, status: 4 - Beta, requires: N/A Automatically mocks resources from serverless.yml in pytest using moto. pytest-servers last release: Aug 15, 2024, status: 3 - Alpha, requires: pytest>=6.2 pytest servers pytest-service last release: Aug 06, 2024, status: 5 - Production/Stable, requires: pytest>=6.0.0 pytest-services last release: Oct 30, 2020, status: 6 - Mature, requires: N/A Services plugin for pytest testing framework pytest-session2file last release: Jan 26, 2021, status: 3 - Alpha, requires: pytest pytest-session2file (aka: pytest-session_to_file for v0.1.0 - v0.1.2) is a py.test plugin for capturing and saving to file the stdout of py.test. pytest-session-fixture-globalize last release: May 15, 2018, status: 4 - Beta, requires: N/A py.test plugin to make session fixtures behave as if written in conftest, even if it is written in some modules pytest-session_to_file last release: Oct 01, 2015, status: 3 - Alpha, requires: N/A pytest-session_to_file is a py.test plugin for capturing and saving to file the stdout of py.test.

pytest-setupinfo

last release: Jan 23, 2023, status: N/A, requires: N/A

Displaying setup info during pytest command run

pytest-sftpserver

last release: Sep 16, 2019, status: 4 - Beta, requires: N/A

```
py.test plugin to locally test sftp server connections.
pytest-shard
      last release: Dec 11, 2020, status: 4 - Beta, requires: pytest
pytest-shared-session-scope
      last release: Aug 28, 2024, status: N/A, requires: pytest>=7
pytest-share-hdf
      last release: Sep 21, 2022, status: 4 - Beta, requires: pytest (>=3.5.0)
      Plugin to save test data in HDF files and retrieve them for comparison
pytest-sharkreport
      last release: Jul 11, 2022, status: N/A, requires: pytest (>=3.5)
      this is pytest report plugin.
pytest-shell
      last release: Mar 27, 2022, status: N/A, requires: N/A
      A pytest plugin to help with testing shell scripts / black box commands
pytest-shell-utilities
      last release: Aug 26, 2024, status: 5 - Production/Stable, requires: pytest>=7.4.0
      Pytest plugin to simplify running shell commands against the system
pytest-sheraf
      last release: Feb 11, 2020, status: N/A, requires: pytest
      Versatile ZODB abstraction layer - pytest fixtures
pytest-sherlock
      last release: Aug 14, 2023, status: 5 - Production/Stable, requires: pytest >=3.5.1
      pytest plugin help to find coupled tests
pytest-shortcuts
      last release: Oct 29, 2020, status: 4 - Beta, requires: pytest (>=3.5.0)
      Expand command-line shortcuts listed in pytest configuration
pytest-shutil
      last release: May 28, 2019, status: 5 - Production/Stable, requires: pytest
      A goodie-bag of unix shell and environment tools for py.test
pytest-simbind
      last release: Mar 28, 2024, status: N/A, requires: pytest>=7.0.0
      Pytest plugin to operate with objects generated by Simbind tool.
pytest-simplehttpserver
      last release: Jun 24, 2021, status: 4 - Beta, requires: N/A
      Simple pytest fixture to spin up an HTTP server
pytest-simple-plugin
      last release: Nov 27, 2019, status: N/A, requires: N/A
      Simple pytest plugin
pytest-simple-settings
      last release: Nov 17, 2020, status: 4 - Beta, requires: pytest
      simple-settings plugin for pytest
```

```
pytest-single-file-logging
      last release: May 05, 2016, status: 4 - Beta, requires: pytest (>=2.8.1)
      Allow for multiple processes to log to a single file
pytest-skip-markers
      last release: Aug 09, 2024, status: 5 - Production/Stable, requires: pytest>=7.1.0
      Pytest Salt Plugin
pytest-skipper
      last release: Mar 26, 2017, status: 3 - Alpha, requires: pytest (>=3.0.6)
      A plugin that selects only tests with changes in execution path
pytest-skippy
      last release: Jan 27, 2018, status: 3 - Alpha, requires: pytest (>=2.3.4)
      Automatically skip tests that don't need to run!
pytest-skip-slow
      last release: Feb 09, 2023, status: N/A, requires: pytest>=6.2.0
      A pytest plugin to skip `@pytest.mark.slow` tests by default.
pytest-skipuntil
      last release: Nov 25, 2023, status: 4 - Beta, requires: pytest >=3.8.0
      A simple pytest plugin to skip flapping test with deadline
pytest-slack
      last release: Dec 15, 2020, status: 5 - Production/Stable, requires: N/A
      Pytest to Slack reporting plugin
pytest-slow
      last release: Sep 28, 2021, status: N/A, requires: N/A
      A pytest plugin to skip `@pytest.mark.slow` tests by default.
pytest-slowest-first
      last release: Dec 11, 2022, status: 4 - Beta, requires: N/A
      Sort tests by their last duration, slowest first
pytest-slow-first
      last release: Jan 30, 2024, status: 4 - Beta, requires: pytest >=3.5.0
      Prioritize running the slowest tests first.
pytest-slow-last
      last release: Dec 10, 2022, status: 4 - Beta, requires: pytest (>=3.5.0)
      Run tests in order of execution time (faster tests first)
pytest-smartcollect
      last release: Oct 04, 2018, status: N/A, requires: pytest (>=3.5.0)
      A plugin for collecting tests that touch changed code
pytest-smartcov
      last release: Sep 30, 2017, status: 3 - Alpha, requires: N/A
```

Smart coverage plugin for pytest.

pvtest-smell last release: Jun 26, 2022, status: N/A, requires: N/A Automated bad smell detection tool for Pytest pytest-smtp last release: Feb 20, 2021, status: N/A, requires: pytest Send email with pytest execution result pytest-smtp4dev last release: Jun 27, 2023, status: 5 - Production/Stable, requires: N/A Plugin for smtp4dev API pytest-smtpd last release: May 15, 2023, status: N/A, requires: pytest An SMTP server for testing built on aiosmtpd pytest-smtp-test-server last release: Dec 03, 2023, status: 2 - Pre-Alpha, requires: pytest (>=7.4.3,<8.0.0) pytest plugin for using 'smtp-test-server' as a fixture pytest-snail last release: Nov 04, 2019, status: 3 - Alpha, requires: pytest (>=5.0.1) Plugin for adding a marker to slow running tests. 16 pytest-snapci last release: Nov 12, 2015, status: N/A, requires: N/A py.test plugin for Snap-CI pytest-snapshot last release: Apr 23, 2022, status: 4 - Beta, requires: pytest (>=3.0.0) A plugin for snapshot testing with pytest. pytest-snapshot-with-message-generator last release: Jul 25, 2023, status: 4 - Beta, requires: pytest (>=3.0.0) A plugin for snapshot testing with pytest. pytest-snmpserver last release: May 12, 2021, status: N/A, requires: N/A pytest-snowflake-bdd last release: Jan 05, 2022, status: 4 - Beta, requires: pytest (>=6.2.0) Setup test data and run tests on snowflake in BDD style! pytest-socket last release: Jan 28, 2024, status: 4 - Beta, requires: pytest (>=6.2.5) Pytest Plugin to disable socket calls during tests pytest-sofaepione last release: Aug 17, 2022, status: N/A, requires: N/A

Test the installation of SOFA and the SofaEpione plugin.

last release: May 05, 2020, status: 3 - Alpha, requires: pytest

3.2. Pytest Plugin List

pytest-soft-assertions

```
pytest-solidity
      last release: Jan 15, 2022, status: 1 - Planning, requires: pytest (<7,>=6.0.1); extra == 'tests'
      A PyTest library plugin for Solidity language.
pytest-solr
      last release: May 11, 2020, status: 3 - Alpha, requires: pytest (>=3.0.0)
      Solr process and client fixtures for py.test.
pytest-sort
      last release: Jan 07, 2024, status: N/A, requires: pytest >=7.4.0
      Tools for sorting test cases
pytest-sorter
      last release: Apr 20, 2021, status: 4 - Beta, requires: pytest (>=3.1.1)
      A simple plugin to first execute tests that historically failed more
pytest-sosu
      last release: Aug 04, 2023, status: 2 - Pre-Alpha, requires: pytest
      Unofficial PyTest plugin for Sauce Labs
pytest-sourceorder
      last release: Sep 01, 2021, status: 4 - Beta, requires: pytest
      Test-ordering plugin for pytest
pytest-spark
      last release: Feb 23, 2020, status: 4 - Beta, requires: pytest
      pytest plugin to run the tests with support of pyspark.
pytest-spawner
      last release: Jul 31, 2015, status: 4 - Beta, requires: N/A
      py.test plugin to spawn process and communicate with them.
pytest-spec
      last release: Aug 04, 2024, status: N/A, requires: pytest; extra == "test"
      Library pytest-spec is a pytest plugin to display test execution output like a SPECIFICATION.
pytest-spec2md
      last release: Apr 10, 2024, status: N/A, requires: pytest>7.0
      Library pytest-spec2md is a pytest plugin to create a markdown specification while running pytest.
pytest-speed
      last release: Jan 22, 2023, status: 3 - Alpha, requires: pytest>=7
      Modern benchmarking library for python with pytest integration.
pytest-sphinx
      last release: Apr 13, 2024, status: 4 - Beta, requires: pytest>=8.1.1
      Doctest plugin for pytest with support for Sphinx-specific doctest-directives
```

pytest-spiratest

last release: Jan 01, 2024, status: N/A, requires: N/A

Exports unit tests as test runs in Spira (SpiraTest/Team/Plan)

```
pytest-splinter
      last release: Sep 09, 2022, status: 6 - Mature, requires: pytest (>=3.0.0)
      Splinter plugin for pytest testing framework
pytest-splinter4
      last release: Feb 01, 2024, status: 6 - Mature, requires: pytest >=8.0.0
      Pytest plugin for the splinter automation library
pytest-split
      last release: Jun 19, 2024, status: 4 - Beta, requires: pytest<9,>=5
      Pytest plugin which splits the test suite to equally sized sub suites based on test execution time.
pytest-split-ext
      last release: Sep 23, 2023, status: 4 - Beta, requires: pytest (>=5,<8)
      Pytest plugin which splits the test suite to equally sized sub suites based on test execution time.
pytest-splitio
      last release: Sep 22, 2020, status: N/A, requires: pytest (<7,>=5.0)
      Split.io SDK integration for e2e tests
pytest-split-tests
      last release: Jul 30, 2021, status: 5 - Production/Stable, requires: pytest (>=2.5)
      A Pytest plugin for running a subset of your tests by splitting them in to equally sized groups. Forked from Mark
      Adams' original project pytest-test-groups.
pytest-split-tests-tresorit
      last release: Feb 22, 2021, status: 1 - Planning, requires: N/A
pytest-splunk-addon
      last release: Aug 28, 2024, status: N/A, requires: pytest<8,>5.4.0
      A Dynamic test tool for Splunk Apps and Add-ons
pytest-splunk-addon-ui-smartx
      last release: Jul 10, 2024, status: N/A, requires: N/A
      Library to support testing Splunk Add-on UX
pytest-splunk-env
      last release: Oct 22, 2020, status: N/A, requires: pytest (>=6.1.1,<7.0.0)
      pytest fixtures for interaction with Splunk Enterprise and Splunk Cloud
pytest-sqitch
      last release: Apr 06, 2020, status: 4 - Beta, requires: N/A
      sqitch for pytest
pytest-sqlalchemy
      last release: Mar 13, 2018, status: 3 - Alpha, requires: N/A
      pytest plugin with sqlalchemy related fixtures
pytest-sqlalchemy-mock
      last release: Aug 10, 2024, status: 3 - Alpha, requires: pytest>=7.0.0
      pytest sqlalchemy plugin for mock
```

pytest-sqlalchemy-session

last release: May 19, 2023, status: 4 - Beta, requires: pytest (>=7.0)

```
A pytest plugin for preserving test isolation that use SQLAlchemy.
pytest-sql-bigguery
      last release: Dec 19, 2019, status: N/A, requires: pytest
      Yet another SQL-testing framework for BigQuery provided by pytest plugin
pytest-sqlfluff
      last release: Dec 21, 2022, status: 4 - Beta, requires: pytest (>=3.5.0)
      A pytest plugin to use sqlfluff to enable format checking of sql files.
pytest-squadcast
      last release: Feb 22, 2022, status: 5 - Production/Stable, requires: pytest
      Pytest report plugin for Squadcast
pytest-srcpaths
      last release: Oct 15, 2021, status: N/A, requires: pytest>=6.2.0
      Add paths to sys.path
pytest-ssh
      last release: May 27, 2019, status: N/A, requires: pytest
      pytest plugin for ssh command run
pytest-start-from
      last release: Apr 11, 2016, status: N/A, requires: N/A
      Start pytest run from a given point
pytest-star-track-issue
      last release: Feb 20, 2024, status: N/A, requires: N/A
      A package to prevent Dependency Confusion attacks against Yandex.
pytest-static
      last release: Aug 09, 2024, status: 1 - Planning, requires: pytest<8.0.0,>=7.4.3
      pytest-static
pytest-stats
      last release: Jul 18, 2024, status: N/A, requires: pytest>=8.0.0
      Collects tests metadata for future analysis, easy to extend for any data store
pytest-statsd
      last release: Nov 30, 2018, status: 5 - Production/Stable, requires: pytest (>=3.0.0)
      pytest plugin for reporting to graphite
pytest-status
      last release: Aug 22, 2024, status: N/A, requires: pytest
      Add status mark for tests
pytest-stepfunctions
      last release: May 08, 2021, status: 4 - Beta, requires: pytest
      A small description
pytest-steps
      last release: Sep 23, 2021, status: 5 - Production/Stable, requires: N/A
```

Create step-wise / incremental tests in pytest.

pytest-stepwise

last release: Dec 01, 2015, status: 4 - Beta, requires: N/A

Run a test suite one failing test at a time.

pytest-stf

last release: Mar 25, 2024, status: N/A, requires: pytest>=5.0

pytest plugin for openSTF

pytest-stoq

last release: Feb 09, 2021, status: 4 - Beta, requires: N/A

A plugin to pytest stoq

pytest-store

last release: Nov 16, 2023, status: 3 - Alpha, requires: pytest (>=7.0.0)

Pytest plugin to store values from test runs

pytest-stress

last release: Dec 07, 2019, status: 4 - Beta, requires: pytest (>=3.6.0)

A Pytest plugin that allows you to loop tests for a user defined amount of time.

pytest-structlog

last release: Jul 25, 2024, status: N/A, requires: pytest

Structured logging assertions

pytest-structmpd

last release: Oct 17, 2018, status: N/A, requires: N/A

provide structured temporary directory

pytest-stub

last release: Apr 28, 2020, status: 5 - Production/Stable, requires: N/A

Stub packages, modules and attributes.

pytest-stubprocess

last release: Sep 17, 2018, status: 3 - Alpha, requires: pytest (>=3.5.0)

Provide stub implementations for subprocesses in Python tests

pytest-study

last release: Sep 26, 2017, status: 3 - Alpha, requires: pytest (>=2.0)

A pytest plugin to organize long run tests (named studies) without interfering the regular tests

pytest-subinterpreter

last release: Nov 25, 2023, status: N/A, requires: pytest>=7.0.0

Run pytest in a subinterpreter

pytest-subprocess

last release: Jul 24, 2024, status: 5 - Production/Stable, requires: pytest>=4.0.0

A plugin to fake subprocess for pytest

pytest-subtesthack

last release: Jul 16, 2022, status: N/A, requires: N/A

A hack to explicitly set up and tear down fixtures.

```
pytest-subtests
      last release: Jul 17, 2024, status: 4 - Beta, requires: pytest>=7.0
      unittest subTest() support and subtests fixture
pytest-subunit
      last release: Sep 17, 2023, status: N/A, requires: pytest (>=2.3)
      pytest-subunit is a plugin for py.test which outputs testsresult in subunit format.
pytest-sugar
      last release: Feb 01, 2024, status: 4 - Beta, requires: pytest >=6.2.0
      pytest-sugar is a plugin for pytest that changes the default look and feel of pytest (e.g. progressbar, show tests that
      fail instantly).
pytest-suitemanager
      last release: Apr 28, 2023, status: 4 - Beta, requires: N/A
      A simple plugin to use with pytest
pytest-suite-timeout
      last release: Jan 26, 2024, status: N/A, requires: pytest>=7.0.0
      A pytest plugin for ensuring max suite time
pytest-supercov
      last release: Jul 02, 2023, status: N/A, requires: N/A
      Pytest plugin for measuring explicit test-file to source-file coverage
pytest-svn
      last release: May 28, 2019, status: 5 - Production/Stable, requires: pytest
      SVN repository fixture for py.test
pytest-symbols
      last release: Nov 20, 2017, status: 3 - Alpha, requires: N/A
      pytest-symbols is a pytest plugin that adds support for passing test environment symbols into pytest tests.
pytest-system-statistics
      last release: Feb 16, 2022, status: 5 - Production/Stable, requires: pytest (>=6.0.0)
      Pytest plugin to track and report system usage statistics
pytest-system-test-plugin
      last release: Feb 03, 2022, status: N/A, requires: N/A
      Pyst - Pytest System-Test Plugin
pytest tagging
      last release: Aug 31, 2024, status: N/A, requires: pytest<8.0.0,>=7.1.3
      a pytest plugin to tag tests
pytest-takeltest
      last release: Feb 15, 2023, status: N/A, requires: N/A
      Fixtures for ansible, testinfra and molecule
pytest-talisker
      last release: Nov 28, 2021, status: N/A, requires: N/A
pytest-tally
```

last release: May 22, 2023, status: 4 - Beta, requires: pytest (>=6.2.5)

A Pytest plugin to generate realtime summary stats, and display them in-console using a text-based dashboard. pytest-tap last release: Jul 15, 2023, status: 5 - Production/Stable, requires: pytest (>=3.0) Test Anything Protocol (TAP) reporting plugin for pytest pytest-tape last release: Mar 17, 2021, status: 4 - Beta, requires: N/A easy assertion with expected results saved to yaml files pytest-target last release: Jan 21, 2021, status: 3 - Alpha, requires: pytest (>=6.1.2,<7.0.0) Pytest plugin for remote target orchestration. pytest-tblineinfo last release: Dec 01, 2015, status: 3 - Alpha, requires: pytest (>=2.0) tblineinfo is a py.test plugin that insert the node id in the final py.test report when -tb=line option is used pytest-tcpclient last release: Nov 16, 2022, status: N/A, requires: pytest (<8,>=7.1.3) A pytest plugin for testing TCP clients pytest-tdd last release: Aug 18, 2023, status: 4 - Beta, requires: N/A run pytest on a python module pytest-teamcity-logblock last release: May 15, 2018, status: 4 - Beta, requires: N/A py.test plugin to introduce block structure in teamcity build log, if output is not captured pytest-telegram last release: Apr 25, 2024, status: 5 - Production/Stable, requires: N/A Pytest to Telegram reporting plugin pytest-telegram-notifier last release: Jun 27, 2023, status: 5 - Production/Stable, requires: N/A Telegram notification plugin for Pytest pytest-tempdir last release: Oct 11, 2019, status: 4 - Beta, requires: pytest (>=2.8.1) Predictable and repeatable tempdir support. pytest-terra-fixt last release: Sep 15, 2022, status: N/A, requires: pytest (==6.2.5) Terraform and Terragrunt fixtures for pytest pytest-terraform

3.2. Pytest Plugin List

pytest-terraform-fixture

last release: May 21, 2024, status: N/A, requires: pytest>=6.0

last release: Nov 14, 2018, status: 4 - Beta, requires: N/A

A pytest plugin for using terraform fixtures

generate terraform resources to use with pytest

pytest-testbook

last release: Dec 11, 2016, status: 3 - Alpha, requires: N/A

A plugin to run tests written in Jupyter notebook

pytest-testconfig

last release: Jan 11, 2020, status: 4 - Beta, requires: pytest (>=3.5.0)

Test configuration plugin for pytest.

pytest-testdata

last release: Aug 30, 2024, status: N/A, requires: pytest

Get and load testdata in pytest projects

pytest-testdirectory

last release: May 02, 2023, status: 5 - Production/Stable, requires: pytest

A py.test plugin providing temporary directories in unit tests.

pytest-testdox

last release: Jul 22, 2023, status: 5 - Production/Stable, requires: pytest (>=4.6.0)

A testdox format reporter for pytest

pytest-test-grouping

last release: Feb 01, 2023, status: 5 - Production/Stable, requires: pytest (>=2.5)

A Pytest plugin for running a subset of your tests by splitting them in to equally sized groups.

pytest-test-groups

last release: Oct 25, 2016, status: 5 - Production/Stable, requires: N/A

A Pytest plugin for running a subset of your tests by splitting them in to equally sized groups.

pytest-testinfra

last release: May 26, 2024, status: 5 - Production/Stable, requires: pytest>=6

Test infrastructures

pytest-testinfra-jpic

last release: Sep 21, 2023, status: 5 - Production/Stable, requires: N/A

Test infrastructures

pytest-testinfra-winrm-transport

last release: Sep 21, 2023, status: 5 - Production/Stable, requires: N/A

Test infrastructures

pytest-testlink-adaptor

last release: Dec 20, 2018, status: 4 - Beta, requires: pytest (>=2.6)

pytest reporting plugin for testlink

pytest-testmon

last release: Feb 27, 2024, status: 4 - Beta, requires: pytest <9,>=5

selects tests affected by changed files and methods

pytest-testmon-dev

last release: Mar 30, 2023, status: 4 - Beta, requires: pytest (<8,>=5)

selects tests affected by changed files and methods

```
pvtest-testmon-oc
      last release: Jun 01, 2022, status: 4 - Beta, requires: pytest (<8,>=5)
      nOly selects tests affected by changed files and methods
pytest-testmon-skip-libraries
      last release: Mar 03, 2023, status: 4 - Beta, requires: pytest (<8,>=5)
      selects tests affected by changed files and methods
pytest-testobject
      last release: Sep 24, 2019, status: 4 - Beta, requires: pytest (>=3.1.1)
      Plugin to use TestObject Suites with Pytest
pytest-testpluggy
      last release: Jan 07, 2022, status: N/A, requires: pytest
      set your encoding
pytest-testrail
      last release: Aug 27, 2020, status: N/A, requires: pytest (>=3.6)
      pytest plugin for creating TestRail runs and adding results
pytest-testrail2
      last release: Feb 10, 2023, status: N/A, requires: pytest (<8.0,>=7.2.0)
      A pytest plugin to upload results to TestRail.
pytest-testrail-api-client
      last release: Dec 14, 2021, status: N/A, requires: pytest
      TestRail Api Python Client
pytest-testrail-appetize
      last release: Sep 29, 2021, status: N/A, requires: N/A
      pytest plugin for creating TestRail runs and adding results
pytest-testrail-client
      last release: Sep 29, 2020, status: 5 - Production/Stable, requires: N/A
      pytest plugin for Testrail
pytest-testrail-e2e
      last release: Oct 11, 2021, status: N/A, requires: pytest (>=3.6)
      pytest plugin for creating TestRail runs and adding results
pytest-testrail-integrator
      last release: Aug 01, 2022, status: N/A, requires: pytest (>=6.2.5)
      Pytest plugin for sending report to testrail system.
pytest-testrail-ns
      last release: Aug 12, 2022, status: N/A, requires: N/A
      pytest plugin for creating TestRail runs and adding results
pytest-testrail-plugin
      last release: Apr 21, 2020, status: 3 - Alpha, requires: pytest
      PyTest plugin for TestRail
pytest-testrail-reporter
      last release: Sep 10, 2018, status: N/A, requires: N/A
```

```
pvtest-testrail-results
      last release: Mar 04, 2024, status: N/A, requires: pytest >=7.2.0
      A pytest plugin to upload results to TestRail.
pytest-testreport
      last release: Dec 01, 2022, status: 4 - Beta, requires: pytest (>=3.5.0)
pytest-testreport-new
      last release: Oct 07, 2023, status: 4 - Beta, requires: pytest >=3.5.0
pytest-testslide
      last release: Jan 07, 2021, status: 5 - Production/Stable, requires: pytest (~=6.2)
      TestSlide fixture for pytest
pytest-test-this
      last release: Sep 15, 2019, status: 2 - Pre-Alpha, requires: pytest (>=2.3)
      Plugin for py.test to run relevant tests, based on naively checking if a test contains a reference to the symbol you
      supply
pytest-test-tracer-for-pytest
      last release: Jun 28, 2024, status: 4 - Beta, requires: pytest>=6.2.0
      A plugin that allows coll test data for use on Test Tracer
pytest-test-tracer-for-pytest-bdd
      last release: Aug 20, 2024, status: 4 - Beta, requires: pytest>=6.2.0
      A plugin that allows coll test data for use on Test Tracer
pytest-test-utils
      last release: Feb 08, 2024, status: N/A, requires: pytest >=3.9
pytest-tesults
      last release: Feb 15, 2024, status: 5 - Production/Stable, requires: pytest >=3.5.0
      Tesults plugin for pytest
pytest-textual-snapshot
      last release: Jul 22, 2024, status: 4 - Beta, requires: pytest>=8.0.0
      Snapshot testing for Textual apps
pytest-tezos
      last release: Jan 16, 2020, status: 4 - Beta, requires: N/A
      pytest-ligo
pytest-tf
      last release: May 29, 2024, status: N/A, requires: pytest<9.0.0,>=8.2.1
      Test your OpenTofu and Terraform config using a PyTest plugin
pytest-th2-bdd
      last release: May 13, 2022, status: N/A, requires: N/A
      pytest_th2_bdd
pytest-thawgun
      last release: May 26, 2020, status: 3 - Alpha, requires: N/A
      Pytest plugin for time travel
```

pytest-thread last release: Jul 07, 2023, status: N/A, requires: N/A pytest-threadleak last release: Jul 03, 2022, status: 4 - Beta, requires: pytest (>=3.1.1) Detects thread leaks pytest-tick last release: Aug 31, 2021, status: 5 - Production/Stable, requires: pytest (>=6.2.5,<7.0.0) Ticking on tests pytest-time last release: Aug 28, 2024, status: 3 - Alpha, requires: pytest pytest-timeassert-ethan last release: Dec 25, 2023, status: N/A, requires: pytest execution duration pytest-timeit last release: Oct 13, 2016, status: 4 - Beta, requires: N/A A pytest plugin to time test function runs pytest-timeout last release: Mar 07, 2024, status: 5 - Production/Stable, requires: pytest >=7.0.0 pytest plugin to abort hanging tests pytest-timeouts last release: Sep 21, 2019, status: 5 - Production/Stable, requires: N/A Linux-only Pytest plugin to control durations of various test case execution phases pytest-timer last release: Dec 26, 2023, status: N/A, requires: pytest A timer plugin for pytest pytest-timestamper last release: Mar 27, 2024, status: N/A, requires: N/A Pytest plugin to add a timestamp prefix to the pytest output pytest-timestamps last release: Sep 11, 2023, status: N/A, requires: pytest (>=7.3,<8.0) A simple plugin to view timestamps for each test pytest-tiny-api-client last release: Jan 04, 2024, status: 5 - Production/Stable, requires: pytest The companion pytest plugin for tiny-api-client pytest-tinybird last release: Aug 29, 2024, status: 4 - Beta, requires: pytest>=3.8.0 A pytest plugin to report test results to tinybird pytest-tipsi-django last release: Feb 05, 2024, status: 5 - Production/Stable, requires: pytest>=6.0.0 Better fixtures for django

pytest-tipsi-testing last release: F

last release: Feb 04, 2024, status: 5 - Production/Stable, requires: pytest>=3.3.0

Better fixtures management. Various helpers

pytest-tldr

last release: Oct 26, 2022, status: 4 - Beta, requires: pytest (>=3.5.0)

A pytest plugin that limits the output to just the things you need.

pytest-tm4j-reporter

last release: Sep 01, 2020, status: N/A, requires: pytest

Cloud Jira Test Management (TM4J) PyTest reporter plugin

pytest-tmnet

last release: Mar 01, 2022, status: N/A, requires: N/A

A small example package

pytest-tmp-files

last release: Dec 08, 2023, *status*: N/A, *requires*: pytest Utilities to create temporary file hierarchies in pytest.

pytest-tmpfs

last release: Aug 29, 2022, status: N/A, requires: pytest

A pytest plugin that helps you on using a temporary filesystem for testing.

pytest-tmreport

last release: Aug 12, 2022, status: N/A, requires: N/A

this is a vue-element ui report for pytest

pytest-tmux

last release: Apr 22, 2023, status: 4 - Beta, requires: N/A

A pytest plugin that enables tmux driven tests

pytest-todo

last release: May 23, 2019, status: 4 - Beta, requires: pytest

A small plugin for the pytest testing framework, marking TODO comments as failure

pytest-tomato

last release: Mar 01, 2019, status: 5 - Production/Stable, requires: N/A

pytest-toolbelt

last release: Aug 12, 2019, status: 3 - Alpha, requires: N/A

This is just a collection of utilities for pytest, but don't really belong in pytest proper.

pytest-toolbox

last release: Apr 07, 2018, status: N/A, requires: pytest (>=3.5.0)

Numerous useful plugins for pytest.

pytest-toolkit

last release: Jun 07, 2024, status: N/A, requires: N/A

Useful utils for testing

pytest-tools

last release: Oct 21, 2022, status: 4 - Beta, requires: N/A

Pytest tools

```
pytest-topo
      last release: Jun 05, 2024, status: N/A, requires: pytest>=7.0.0
      Topological sorting for pytest
pytest-tornado
      last release: Jun 17, 2020, status: 5 - Production/Stable, requires: pytest (>=3.6)
      A py.test plugin providing fixtures and markers to simplify testing of asynchronous tornado applications.
pytest-tornado5
      last release: Nov 16, 2018, status: 5 - Production/Stable, requires: pytest (>=3.6)
      A py.test plugin providing fixtures and markers to simplify testing of asynchronous tornado applications.
pvtest-tornado-ven3
      last release: Oct 15, 2018, status: 5 - Production/Stable, requires: N/A
      A py.test plugin providing fixtures and markers to simplify testing of asynchronous tornado applications.
pytest-tornasync
      last release: Jul 15, 2019, status: 3 - Alpha, requires: pytest (>=3.0)
      py.test plugin for testing Python 3.5+ Tornado code
pytest-trace
      last release: Jun 19, 2022, status: N/A, requires: pytest (>=4.6)
      Save OpenTelemetry spans generated during testing
pytest-track
      last release: Feb 26, 2021, status: 3 - Alpha, requires: pytest (>=3.0)
pytest-translations
      last release: Sep 11, 2023, status: 5 - Production/Stable, requires: pytest (>=7)
      Test your translation files.
pytest-travis-fold
      last release: Nov 29, 2017, status: 4 - Beta, requires: pytest (>=2.6.0)
      Folds captured output sections in Travis CI build log
pytest-trello
      last release: Nov 20, 2015, status: 5 - Production/Stable, requires: N/A
      Plugin for py.test that integrates trello using markers
pytest-trepan
      last release: Jul 28, 2018, status: 5 - Production/Stable, requires: N/A
      Pytest plugin for trepan debugger.
pytest-trialtemp
      last release: Jun 08, 2015, status: N/A, requires: N/A
      py.test plugin for using the same _trial_temp working directory as trial
pytest-trio
      last release: Nov 01, 2022, status: N/A, requires: pytest (>=7.2.0)
      Pytest plugin for trio
pytest-trytond
      last release: Nov 04, 2022, status: 4 - Beta, requires: pytest (>=5)
```

Pytest plugin for the Tryton server framework

```
pytest-tspwplib
      last release: Jan 08, 2021, status: 4 - Beta, requires: pytest (>=3.5.0)
      A simple plugin to use with tspwplib
pytest-tst
      last release: Apr 27, 2022, status: N/A, requires: pytest (>=5.0.0)
      Customize pytest options, output and exit code to make it compatible with tst
pytest-tstcls
      last release: Mar 23, 2020, status: 5 - Production/Stable, requires: N/A
      Test Class Base
pvtest-tui
      last release: Dec 08, 2023, status: 4 - Beta, requires: N/A
      Text User Interface (TUI) and HTML report for Pytest test runs
pytest-tutorials
      last release: Mar 11, 2023, status: N/A, requires: N/A
pytest-twilio-conversations-client-mock
      last release: Aug 02, 2022, status: N/A, requires: N/A
pytest-twisted
      last release: Jul 10, 2024, status: 5 - Production/Stable, requires: pytest>=2.3
      A twisted plugin for pytest.
pytest-typechecker
      last release: Feb 04, 2022, status: N/A, requires: pytest (>=6.2.5,<7.0.0)
      Run type checkers on specified test files
pytest-typhoon-config
      last release: Apr 07, 2022, status: 5 - Production/Stable, requires: N/A
      A Typhoon HIL plugin that facilitates test parameter configuration at runtime
pytest-typhoon-polarion
      last release: Feb 01, 2024, status: 4 - Beta, requires: N/A
      Typhoontest plugin for Siemens Polarion
pytest-typhoon-xray
      last release: Aug 15, 2023, status: 4 - Beta, requires: N/A
      Typhoon HIL plugin for pytest
pytest-typing-runner
      last release: Aug 29, 2024, status: N/A, requires: pytest==8.2.2; extra == "tests"
      Pytest plugin to make it easier to run and check python code against static type checkers
pytest-tytest
      last release: May 25, 2020, status: 4 - Beta, requires: pytest (>=5.4.2)
      Typhoon HIL plugin for pytest
pytest-ubersmith
      last release: Apr 13, 2015, status: N/A, requires: N/A
```

Easily mock calls to ubersmith at the 'requests' level.

pytest-ui

last release: Jul 05, 2021, status: 4 - Beta, requires: pytest

Text User Interface for running python tests

pytest-ui-failed-screenshot

last release: Dec 06, 2022, status: N/A, requires: N/A

UI自动测试失败时自动截图,并将截图加入到测试报告中

pytest-ui-failed-screenshot-allure

last release: Dec 06, 2022, status: N/A, requires: N/A

UI自动测试失败时自动截图,并将截图加入到Allure测试报告中

pytest-uncollect-if

last release: Mar 24, 2024, status: 4 - Beta, requires: pytest>=6.2.0

A plugin to uncollect pytests tests rather than using skipif

pytest-unflakable

last release: Apr 30, 2024, status: 4 - Beta, requires: pytest>=6.2.0

Unflakable plugin for PyTest

pytest-unhandled-exception-exit-code

last release: Jun 22, 2020, status: 5 - Production/Stable, requires: pytest (>=2.3)

Plugin for py.test set a different exit code on uncaught exceptions

pytest-unique

last release: Sep 15, 2023, *status*: N/A, *requires*: pytest (>=7.4.2,<8.0.0)

Pytest fixture to generate unique values.

pytest-unittest-filter

last release: Jan 12, 2019, status: 4 - Beta, requires: pytest (>=3.1.0)

A pytest plugin for filtering unittest-based test classes

pytest-unmarked

last release: Aug 27, 2019, status: 5 - Production/Stable, requires: N/A

Run only unmarked tests

pytest-unordered

last release: Jul 05, 2024, status: 4 - Beta, requires: pytest>=7.0.0

Test equality of unordered collections in pytest

pytest-unstable

last release: Sep 27, 2022, status: 4 - Beta, requires: N/A

Set a test as unstable to return 0 even if it failed

pytest-unused-fixtures

last release: Apr 08, 2024, status: 4 - Beta, requires: pytest>7.3.2

A pytest plugin to list unused fixtures after a test run.

pytest-upload-report

last release: Jun 18, 2021, status: 5 - Production/Stable, requires: N/A

pytest-upload-report is a plugin for pytest that upload your test report for test results.

```
pytest-utils
      last release: Feb 02, 2023, status: 4 - Beta, requires: pytest (>=7.0.0,<8.0.0)
      Some helpers for pytest.
pytest-vagrant
      last release: Sep 07, 2021, status: 5 - Production/Stable, requires: pytest
      A py.test plugin providing access to vagrant.
pytest-valgrind
      last release: May 19, 2021, status: N/A, requires: N/A
pytest-variables
      last release: Feb 01, 2024, status: 5 - Production/Stable, requires: pytest>=7.0.0
      pytest plugin for providing variables to tests/fixtures
pytest-variant
      last release: Jun 06, 2022, status: N/A, requires: N/A
      Variant support for Pytest
pytest-vcr
      last release: Apr 26, 2019, status: 5 - Production/Stable, requires: pytest (>=3.6.0)
      Plugin for managing VCR.py cassettes
pytest-vcr-delete-on-fail
      last release: Feb 16, 2024, status: 5 - Production/Stable, requires: pytest (>=8.0.0,<9.0.0)
      A pytest plugin that automates vcrpy cassettes deletion on test failure.
pytest-vcrpandas
      last release: Jan 12, 2019, status: 4 - Beta, requires: pytest
      Test from HTTP interactions to dataframe processed.
pytest-vcs
      last release: Sep 22, 2022, status: 4 - Beta, requires: N/A
pytest-venv
      last release: Nov 23, 2023, status: 4 - Beta, requires: pytest
      py.test fixture for creating a virtual environment
pytest-verbose-parametrize
      last release: May 28, 2019, status: 5 - Production/Stable, requires: pytest
      More descriptive output for parametrized py.test tests
pytest-vimqf
      last release: Feb 08, 2021, status: 4 - Beta, requires: pytest (>=6.2.2,<7.0.0)
      A simple pytest plugin that will shrink pytest output when specified, to fit vim quickfix window.
pytest-virtualenv
      last release: May 28, 2019, status: 5 - Production/Stable, requires: pytest
      Virtualenv fixture for py.test
pytest-visual
      last release: Nov 01, 2023, status: 3 - Alpha, requires: pytest >=7.0.0
pytest-vnc
      last release: Nov 06, 2023, status: N/A, requires: pytest
```

VNC client for Pytest

pytest-voluptuous

last release: Jun 09, 2020, status: N/A, requires: pytest

Pytest plugin for asserting data against voluptuous schema.

pytest-vscodedebug

last release: Dec 04, 2020, status: 4 - Beta, requires: N/A

A pytest plugin to easily enable debugging tests within Visual Studio Code

pytest-vscode-pycharm-cls

last release: Feb 01, 2023, status: N/A, requires: pytest

A PyTest helper to enable start remote debugger on test start or failure or when pytest.set_trace is used.

pytest-vts

last release: Jun 05, 2019, status: N/A, requires: pytest (>=2.3)

pytest plugin for automatic recording of http stubbed tests

pytest-vulture

last release: Jun 01, 2023, status: N/A, requires: pytest (>=7.0.0)

A pytest plugin to checks dead code with vulture

pytest-vw

last release: Oct 07, 2015, status: 4 - Beta, requires: N/A

pytest-vw makes your failing test cases succeed under CI tools scrutiny

pytest-vyper

last release: May 28, 2020, status: 2 - Pre-Alpha, requires: N/A

Plugin for the vyper smart contract language.

pytest-wa-e2e-plugin

last release: Feb 18, 2020, status: 4 - Beta, requires: pytest (>=3.5.0)

Pytest plugin for testing whatsapp bots with end to end tests

pytest-wake

last release: Mar 20, 2024, status: N/A, requires: pytest

pytest-watch

last release: May 20, 2018, status: N/A, requires: N/A

Local continuous test runner with pytest and watchdog.

pytest-watcher

last release: Aug 28, 2024, status: 4 - Beta, requires: N/A

Automatically rerun your tests on file modifications

pytest_wdb

last release: Jul 04, 2016, status: N/A, requires: N/A

Trace pytest tests with wdb to halt on error with -wdb.

pytest-wdl

last release: Nov 17, 2020, status: 5 - Production/Stable, requires: N/A

Pytest plugin for testing WDL workflows.

pytest-web3-data

last release: Oct 04, 2023, status: 4 - Beta, requires: pytest

A pytest plugin to fetch test data from IPFS HTTP gateways during pytest execution.

pytest-webdriver

last release: May 28, 2019, status: 5 - Production/Stable, requires: pytest

Selenium webdriver fixture for py.test

pytest-webtest-extras

last release: Jun 08, 2024, status: N/A, requires: pytest>=7.0.0

Pytest plugin to enhance pytest-html and allure reports of webtest projects by adding screenshots, comments and webpage sources.

pytest-wetest

last release: Nov 10, 2018, status: 4 - Beta, requires: N/A

Welian API Automation test framework pytest plugin

pytest-when

last release: May 28, 2024, status: N/A, requires: pytest>=7.3.1

Utility which makes mocking more readable and controllable

pytest-whirlwind

last release: Jun 12, 2020, status: N/A, requires: N/A

Testing Tornado.

pytest-wholenodeid

last release: Aug 26, 2015, status: 4 - Beta, requires: pytest (>=2.0)

pytest addon for displaying the whole node id for failures

pytest-win32consoletitle

last release: Aug 08, 2021, status: N/A, requires: N/A

Pytest progress in console title (Win32 only)

pytest-winnotify

last release: Apr 22, 2016, status: N/A, requires: N/A

Windows tray notifications for py.test results.

pytest-wiremock

last release: Mar 27, 2022, status: N/A, requires: pytest (>=7.1.1,<8.0.0)

A pytest plugin for programmatically using wiremock in integration tests

pytest-with-docker

last release: Nov 09, 2021, status: N/A, requires: pytest

pytest with docker helpers.

pytest-workflow

last release: Mar 18, 2024, status: 5 - Production/Stable, requires: pytest >=7.0.0

A pytest plugin for configuring workflow/pipeline tests using YAML files

pytest-xdist

last release: Apr 28, 2024, status: 5 - Production/Stable, requires: pytest>=7.0.0

pytest xdist plugin for distributed testing, most importantly across multiple CPUs

```
pytest-xdist-debug-for-graingert
      last release: Jul 24, 2019, status: 5 - Production/Stable, requires: pytest (>=4.4.0)
      pytest xdist plugin for distributed testing and loop-on-failing modes
pytest-xdist-forked
      last release: Feb 10, 2020, status: 5 - Production/Stable, requires: pytest (>=4.4.0)
      forked from pytest-xdist
pytest-xdist-tracker
      last release: Nov 18, 2021, status: 3 - Alpha, requires: pytest (>=3.5.1)
      pytest plugin helps to reproduce failures for particular xdist node
pytest-xdist-worker-stats
      last release: Apr 16, 2024, status: 4 - Beta, requires: pytest>=7.0.0
      A pytest plugin to list worker statistics after a xdist run.
pytest-xfaillist
      last release: Sep 17, 2021, status: N/A, requires: pytest (>=6.2.2,<7.0.0)
      Maintain a xfaillist in an additional file to avoid merge-conflicts.
pytest-xfiles
      last release: Feb 27, 2018, status: N/A, requires: N/A
      Pytest fixtures providing data read from function, module or package related (x)files.
pytest-xiuyu
      last release: Jul 25, 2023, status: 5 - Production/Stable, requires: N/A
      This is a pytest plugin
pytest-xlog
      last release: May 31, 2020, status: 4 - Beta, requires: N/A
      Extended logging for test and decorators
pytest-xlsx
      last release: Aug 07, 2024, status: N/A, requires: pytest~=8.2.2
      pytest plugin for generating test cases by xlsx(excel)
pytest-xpara
      last release: Aug 07, 2024, status: 3 - Alpha, requires: pytest
      An extended parametrizing plugin of pytest.
pytest-xprocess
      last release: May 19, 2024, status: 4 - Beta, requires: pytest>=2.8
      A pytest plugin for managing processes across test runs.
pytest-xray
      last release: May 30, 2019, status: 3 - Alpha, requires: N/A
pytest-xrayjira
      last release: Mar 17, 2020, status: 3 - Alpha, requires: pytest (==4.3.1)
pytest-xray-server
      last release: May 03, 2022, status: 3 - Alpha, requires: pytest (>=5.3.1)
pytest-xskynet
      last release: Feb 20, 2024, status: N/A, requires: N/A
```

A package to prevent Dependency Confusion attacks against Yandex.

pytest-xstress

last release: Jun 01, 2024, status: N/A, requires: pytest<9.0.0,>=8.0.0

pytest-xvfb

last release: May 29, 2023, status: 4 - Beta, requires: pytest (>=2.8.1)

A pytest plugin to run Xvfb (or Xephyr/Xvnc) for tests.

pytest-xvirt

last release: Jul 03, 2024, status: 4 - Beta, requires: pytest>=7.2.2

A pytest plugin to virtualize test. For example to transparently running them on a remote box.

pytest-yaml

last release: Oct 05, 2018, status: N/A, requires: pytest

This plugin is used to load yaml output to your test using pytest framework.

pytest-yaml-sanmu

last release: Aug 16, 2024, status: N/A, requires: pytest~=8.2.2

Pytest plugin for generating test cases with YAML. In test cases, you can use markers, fixtures, variables, and even call Python functions.

pytest-yamltree

last release: Mar 02, 2020, status: 4 - Beta, requires: pytest (>=3.1.1)

Create or check file/directory trees described by YAML

pytest-yamlwsgi

last release: May 11, 2010, status: N/A, requires: N/A

Run tests against wsgi apps defined in yaml

pytest-yaml-yoyo

last release: Jun 19, 2023, status: N/A, requires: pytest (>=7.2.0)

http/https API run by yaml

pytest-yapf

last release: Jul 06, 2017, status: 4 - Beta, requires: pytest (>=3.1.1)

Run yapf

pytest-yapf3

last release: Mar 29, 2023, status: 5 - Production/Stable, requires: pytest (>=7)

Validate your Python file format with yapf

pytest-yield

last release: Jan 23, 2019, status: N/A, requires: N/A

PyTest plugin to run tests concurrently, each 'yield' switch context to other one

pytest-yls

last release: Mar 30, 2024, status: N/A, requires: pytest<8.0.0,>=7.2.2

Pytest plugin to test the YLS as a whole.

pytest-youqu-playwright

last release: Jun 12, 2024, status: N/A, requires: pytest

pytest-youqu-playwright

```
pytest-yuk
      last release: Mar 26, 2021, status: N/A, requires: pytest>=5.0.0
      Display tests you are uneasy with, using ②/② for pass/fail of tests marked with yuk.
pytest-zafira
      last release: Sep 18, 2019, status: 5 - Production/Stable, requires: pytest (==4.1.1)
      A Zafira plugin for pytest
pytest-zap
      last release: May 12, 2014, status: 4 - Beta, requires: N/A
      OWASP ZAP plugin for py.test.
pytest-zcc
      last release: Jun 02, 2024, status: N/A, requires: N/A
      eee
pytest-zebrunner
      last release: Jul 04, 2024, status: 5 - Production/Stable, requires: pytest>=4.5.0
      Pytest connector for Zebrunner reporting
pytest-zeebe
      last release: Feb 01, 2024, status: N/A, requires: pytest (>=7.4.2,<8.0.0)
      Pytest fixtures for testing Camunda 8 processes using a Zeebe test engine.
pytest-zephyr-scale-integration
      last release: Aug 20, 2024, status: N/A, requires: pytest
      A library for integrating Jira Zephyr Scale (AdaptavistTM4J) with pytest
pytest-zest
      last release: Nov 17, 2022, status: N/A, requires: N/A
      Zesty additions to pytest.
pytest-zhongwen-wendang
      last release: Mar 04, 2024, status: 4 - Beta, requires: N/A
      PyTest 中文文档
pytest-zigzag
      last release: Feb 27, 2019, status: 4 - Beta, requires: pytest (~=3.6)
      Extend py.test for RPC OpenStack testing.
pytest-zulip
      last release: May 07, 2022, status: 5 - Production/Stable, requires: pytest
      Pytest report plugin for Zulip
pytest-zy
```

last release: Mar 24, 2024, status: N/A, requires: pytest~=7.2.0

接口自动化测试框架

3.3 Configuration

3.3.1 Command line options and configuration file settings

You can get help on command line options and values in INI-style configurations files by using the general help option:

```
pytest -h # prints options _and_ config file settings
```

This will display command line and configuration file settings which were registered by installed plugins.

3.3.2 Configuration file formats

Many pytest settings can be set in a configuration file, which by convention resides in the root directory of your repository.

A quick example of the configuration files supported by pytest:

pytest.ini

pytest.ini files take precedence over other files, even when empty.

Alternatively, the hidden version .pytest.ini can be used.

```
# pytest.ini or .pytest.ini
[pytest]
minversion = 6.0
addopts = -ra -q
testpaths =
    tests
    integration
```

pyproject.toml

Added in version 6.0.

pyproject.toml are considered for configuration when they contain a tool.pytest.ini_options table.

```
# pyproject.toml
[tool.pytest.ini_options]
minversion = "6.0"
addopts = "-ra -q"
testpaths = [
    "tests",
    "integration",
]
```

Note

One might wonder why [tool.pytest.ini_options] instead of [tool.pytest] as is the case with other tools.

The reason is that the pytest team intends to fully utilize the rich TOML data format for configuration in the future, reserving the [tool.pytest] table for that. The ini_options table is being used, for now, as a bridge between the existing .ini configuration system and the future configuration format.

tox.ini

tox.ini files are the configuration files of the tox project, and can also be used to hold pytest configuration if they have a [pytest] section.

```
# tox.ini
[pytest]
minversion = 6.0
addopts = -ra -q
testpaths =
    tests
    integration
```

setup.cfg

setup.cfg files are general purpose configuration files, used originally by distutils (now deprecated) and setuptools, and can also be used to hold pytest configuration if they have a [tool:pytest] section.

```
# setup.cfg
[tool:pytest]
minversion = 6.0
addopts = -ra -q
testpaths =
   tests
   integration
```

Warning

Usage of setup.cfg is not recommended unless for very simple use cases. .cfg files use a different parser than pytest.ini and tox.ini which might cause hard to track down problems. When possible, it is recommended to use the latter files, or pyproject.toml, to hold your pytest configuration.

3.3.3 Initialization: determining rootdir and configfile

pytest determines a rootdir for each test run which depends on the command line arguments (specified test files, paths) and on the existence of configuration files. The determined rootdir and configfile are printed as part of the pytest header during startup.

Here's a summary what pytest uses rootdir for:

- Construct *nodeids* during collection; each test is assigned a unique *nodeid* which is rooted at the rootdir and takes into account the full path, class name, function name and parametrization (if any).
- Is used by plugins as a stable location to store project/test run specific information; for example, the internal *cache* plugin creates a .pytest_cache subdirectory in rootdir to store its cross-test run state.

rootdir is **NOT** used to modify sys.path/PYTHONPATH or influence how modules are imported. See *pytest import* mechanisms and sys.path/PYTHONPATH for more details.

The --rootdir=path command-line option can be used to force a specific directory. Note that contrary to other command-line options, --rootdir cannot be used with addopts inside pytest.ini because the rootdir is used to find pytest.ini already.

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Finding the rootdir

Here is the algorithm which finds the rootdir from args:

- If -c is passed in the command-line, use that as configuration file, and its directory as rootdir.
- Determine the common ancestor directory for the specified args that are recognised as paths that exist in the file system. If no such paths are found, the common ancestor directory is set to the current working directory.
- Look for pytest.ini, pyproject.toml, tox.ini, and setup.cfg files in the ancestor directory and upwards. If one is matched, it becomes the configfile and its directory becomes the rootdir.
- If no configuration file was found, look for setup.py upwards from the common ancestor directory to determine the rootdir.
- If no setup.py was found, look for pytest.ini, pyproject.toml, tox.ini, and setup.cfg in each of the specified args and upwards. If one is matched, it becomes the configfile and its directory becomes the rootdir.
- If no configfile was found and no configuration argument is passed, use the already determined common ancestor as root directory. This allows the use of pytest in structures that are not part of a package and don't have any particular configuration file.

If no args are given, pytest collects test below the current working directory and also starts determining the rootdir from there.

Files will only be matched for configuration if:

- pytest.ini: will always match and take precedence, even if empty.
- pyproject.toml: contains a [tool.pytest.ini_options] table.
- tox.ini: contains a [pytest] section.
- setup.cfg: contains a [tool:pytest] section.

Finally, a pyproject.toml file will be considered the configfile if no other match was found, in this case even if it does not contain a [tool.pytest.ini_options] table (this was added in 8.1).

The files are considered in the order above. Options from multiple configfiles candidates are never merged - the first match wins.

The configuration file also determines the value of the rootpath.

The Config object (accessible via hooks or through the pytestconfig fixture) will subsequently carry these attributes:

- config.rootpath: the determined root directory, guaranteed to exist. It is used as a reference directory for constructing test addresses ("nodeids") and can be used also by plugins for storing per-testrun information.
- config.inipath: the determined configfile, may be None (it is named inipath for historical reasons).

Added in version 6.1: The config.rootpath and config.inipath properties. They are pathlib.Path versions of the older config.rootdir and config.inifile, which have type py.path.local, and still exist for backward compatibility.

Example:

```
pytest path/to/testdir path/other/
```

will determine the common ancestor as path and then check for configuration files as follows:

```
# first look for pytest.ini files
path/pytest.ini
path/pyproject.toml # must contain a [tool.pytest.ini_options] table to match
path/tox.ini # must contain [pytest] section to match
path/setup.cfg # must contain [tool:pytest] section to match
pytest.ini
... # all the way up to the root

# now look for setup.py
path/setup.py
setup.py
... # all the way up to the root
```

A Warning

Custom pytest plugin commandline arguments may include a path, as in pytest --log-output ../../ test.log args. Then args is mandatory, otherwise pytest uses the folder of test.log for rootdir determination (see also #1435). A dot. for referencing to the current working directory is also possible.

3.3.4 Builtin configuration file options

For the full list of options consult the reference documentation.

3.3.5 Syntax highlighting theme customization

The syntax highlighting themes used by pytest can be customized using two environment variables:

- PYTEST_THEME sets a pygment style to use.
- PYTEST_THEME_MODE sets this style to *light* or *dark*.

3.4 API Reference

This page contains the full reference to pytest's API.

3.4.1 Constants

```
pytest.__version__
```

The current pytest version, as a string:

```
>>> import pytest
>>> pytest.__version__
'7.0.0'
```

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pytest.version_tuple

Added in version 7.0.

The current pytest version, as a tuple:

```
>>> import pytest
>>> pytest.version_tuple
(7, 0, 0)
```

For pre-releases, the last component will be a string with the prerelease version:

```
>>> import pytest
>>> pytest.version_tuple
(7, 0, '0rc1')
```

3.4.2 Functions

pytest.approx

approx (expected, rel=None, abs=None, nan_ok=False)

Assert that two numbers (or two ordered sequences of numbers) are equal to each other within some tolerance.

Due to the Floating-Point Arithmetic: Issues and Limitations, numbers that we would intuitively expect to be equal are not always so:

```
>>> 0.1 + 0.2 == 0.3
False
```

This problem is commonly encountered when writing tests, e.g. when making sure that floating-point values are what you expect them to be. One way to deal with this problem is to assert that two floating-point numbers are equal to within some appropriate tolerance:

```
>>> abs((0.1 + 0.2) - 0.3) < 1e-6
True
```

However, comparisons like this are tedious to write and difficult to understand. Furthermore, absolute comparisons like the one above are usually discouraged because there's no tolerance that works well for all situations. 1e-6 is good for numbers around 1, but too small for very big numbers and too big for very small ones. It's better to express the tolerance as a fraction of the expected value, but relative comparisons like that are even more difficult to write correctly and concisely.

The approx class performs floating-point comparisons using a syntax that's as intuitive as possible:

```
>>> from pytest import approx
>>> 0.1 + 0.2 == approx(0.3)
True
```

The same syntax also works for ordered sequences of numbers:

```
>>> (0.1 + 0.2, 0.2 + 0.4) == approx((0.3, 0.6))
True
```

numpy arrays:

```
>>> import numpy as np
>>> np.array([0.1, 0.2]) + np.array([0.2, 0.4]) == approx(np.array([0.3, 0.6]))
True
```

And for a numpy array against a scalar:

```
>>> import numpy as np
>>> np.array([0.1, 0.2]) + np.array([0.2, 0.1]) == approx(0.3)
True
```

Only ordered sequences are supported, because approx needs to infer the relative position of the sequences without ambiguity. This means sets and other unordered sequences are not supported.

Finally, dictionary *values* can also be compared:

```
>>> {'a': 0.1 + 0.2, 'b': 0.2 + 0.4} == approx({'a': 0.3, 'b': 0.6})
True
```

The comparison will be true if both mappings have the same keys and their respective values match the expected tolerances.

Tolerances

By default, approx considers numbers within a relative tolerance of 1e-6 (i.e. one part in a million) of its expected value to be equal. This treatment would lead to surprising results if the expected value was 0.0, because nothing but 0.0 itself is relatively close to 0.0. To handle this case less surprisingly, approx also considers numbers within an absolute tolerance of 1e-12 of its expected value to be equal. Infinity and NaN are special cases. Infinity is only considered equal to itself, regardless of the relative tolerance. NaN is not considered equal to anything by default, but you can make it be equal to itself by setting the nan_ok argument to True. (This is meant to facilitate comparing arrays that use NaN to mean "no data".)

Both the relative and absolute tolerances can be changed by passing arguments to the approx constructor:

```
>>> 1.0001 == approx(1)
False
>>> 1.0001 == approx(1, rel=1e-3)
True
>>> 1.0001 == approx(1, abs=1e-3)
True
```

If you specify abs but not rel, the comparison will not consider the relative tolerance at all. In other words, two numbers that are within the default relative tolerance of 1e-6 will still be considered unequal if they exceed the specified absolute tolerance. If you specify both abs and rel, the numbers will be considered equal if either tolerance is met:

```
>>> 1 + 1e-8 == approx(1)
True
>>> 1 + 1e-8 == approx(1, abs=1e-12)
False
>>> 1 + 1e-8 == approx(1, rel=1e-6, abs=1e-12)
True
```

You can also use approx to compare nonnumeric types, or dicts and sequences containing nonnumeric types, in which case it falls back to strict equality. This can be useful for comparing dicts and sequences that can contain optional values:

If you're thinking about using approx, then you might want to know how it compares to other good ways of comparing floating-point numbers. All of these algorithms are based on relative and absolute tolerances and should agree for the most part, but they do have meaningful differences:

- math.isclose(a, b, rel_tol=1e-9, abs_tol=0.0): True if the relative tolerance is met w.r.t. either a or b or if the absolute tolerance is met. Because the relative tolerance is calculated w.r.t. both a and b, this test is symmetric (i.e. neither a nor b is a "reference value"). You have to specify an absolute tolerance if you want to compare to 0.0 because there is no tolerance by default. More information: math.isclose().
- numpy.isclose(a, b, rtol=1e-5, atol=1e-8): True if the difference between a and b is less that the sum of the relative tolerance w.r.t. b and the absolute tolerance. Because the relative tolerance is only calculated w.r.t. b, this test is asymmetric and you can think of b as the reference value. Support for comparing sequences is provided by numpy.allclose(). More information: numpy.isclose.
- unittest.TestCase.assertAlmostEqual (a, b): True if a and b are within an absolute tolerance of 1e-7. No relative tolerance is considered, so this function is not appropriate for very large or very small numbers. Also, it's only available in subclasses of unittest.TestCase and it's ugly because it doesn't follow PEP8. More information: unittest.TestCase.assertAlmostEqual().
- a == pytest.approx(b, rel=1e-6, abs=1e-12): True if the relative tolerance is met w.r.t. b or if the absolute tolerance is met. Because the relative tolerance is only calculated w.r.t. b, this test is asymmetric and you can think of b as the reference value. In the special case that you explicitly specify an absolute tolerance but not a relative tolerance, only the absolute tolerance is considered.

1 Note

approx can handle numpy arrays, but we recommend the specialised test helpers in Test support (numpy.testing) if you need support for comparisons, NaNs, or ULP-based tolerances.

To match strings using regex, you can use Matches from the re_assert package.

Warning

Changed in version 3.2.

In order to avoid inconsistent behavior, TypeError is raised for >, >=, < and <= comparisons. The example below illustrates the problem:

```
      assert approx(0.1) > 0.1 + 1e-10 # calls approx(0.1).__gt__(0.1 + 1e-10)

      assert 0.1 + 1e-10 > approx(0.1) # calls approx(0.1).__lt__(0.1 + 1e-10)
```

In the second example one expects approx(0.1).__le__(0.1 + 1e-10) to be called. But instead, approx(0.1).__lt__(0.1 + 1e-10) is used to comparison. This is because the call hierarchy of rich comparisons follows a fixed behavior. More information: object.__ge__()

Changed in version 3.7.1: approx raises TypeError when it encounters a dict value or sequence element of

nonnumeric type.

Changed in version 6.1.0: approx falls back to strict equality for nonnumeric types instead of raising TypeError.

pytest.fail

Tutorial: How to use skip and xfail to deal with tests that cannot succeed

```
fail (reason[, pytrace=True, msg=None])
```

Explicitly fail an executing test with the given message.

Parameters

- **reason** (str) The message to show the user as reason for the failure.
- **pytrace** (bool) If False, msg represents the full failure information and no python traceback will be reported.

Raises

pytest.fail.Exception - The exception that is raised.

```
class pytest.fail.Exception
```

The exception raised by pytest.fail().

pytest.skip

```
skip (reason[, allow_module_level=False, msg=None])
```

Skip an executing test with the given message.

This function should be called only during testing (setup, call or teardown) or during collection by using the allow_module_level flag. This function can be called in doctests as well.

Parameters

- **reason** (str) The message to show the user as reason for the skip.
- allow_module_level (bool) Allows this function to be called at module level. Raising the skip exception at module level will stop the execution of the module and prevent the collection of all tests in the module, even those defined before the skip call.

Defaults to False.

Raises

pytest.skip.Exception - The exception that is raised.

1 Note

It is better to use the *pytest.mark.skipif* marker when possible to declare a test to be skipped under certain conditions like mismatching platforms or dependencies. Similarly, use the # doctest: +SKIP directive (see doctest.SKIP) to skip a doctest statically.

class pytest.skip.Exception

The exception raised by pytest.skip().

pytest.importorskip

importorskip (modname, minversion=None, reason=None, *, exc_type=None)

Import and return the requested module modname, or skip the current test if the module cannot be imported.

Parameters

- **modname** (str) The name of the module to import.
- minversion (str / None) If given, the imported module's __version__ attribute must be at least this minimal version, otherwise the test is still skipped.
- reason (str / None) If given, this reason is shown as the message when the module cannot be imported.
- exc_type (type[ImportError] / None) The exception that should be captured in order to skip modules. Must be ImportError or a subclass.

If the module can be imported but raises ImportError, pytest will issue a warning to the user, as often users expect the module not to be found (which would raise ModuleNot-FoundError instead).

This warning can be suppressed by passing exc type=ImportError explicitly.

See pytest.importorskip default behavior regarding ImportError for details.

Returns

The imported module. This should be assigned to its canonical name.

Raises

```
pytest.skip.Exception - If the module cannot be imported.
```

Return type

Any

Example:

```
docutils = pytest.importorskip("docutils")
```

Added in version 8.2: The exc_type parameter.

pytest.xfail

```
xfail (reason=")
```

Imperatively xfail an executing test or setup function with the given reason.

This function should be called only during testing (setup, call or teardown).

No other code is executed after using xfail() (it is implemented internally by raising an exception).

Parameters

reason (str) – The message to show the user as reason for the xfail.



1 Note

It is better to use the pytest.mark.xfail marker when possible to declare a test to be xfailed under certain conditions like known bugs or missing features.

Raises

pytest.xfail.Exception - The exception that is raised.

class pytest.xfail.Exception

The exception raised by pytest.xfail().

pytest.exit

```
exit (reason[, returncode=None, msg=None])
```

Exit testing process.

Parameters

- reason (str) The message to show as the reason for exiting pytest. reason has a default value only because msg is deprecated.
- returncode (int / None) Return code to be used when exiting pytest. None means the same as 0 (no error), same as sys.exit().

Raises

pytest.exit.Exception - The exception that is raised.

```
class pytest.exit.Exception
```

The exception raised by pytest.exit().

pytest.main

Tutorial: Calling pytest from Python code

main (args=None, plugins=None)

Perform an in-process test run.

Parameters

- args (list[str] | PathLike[str] | None) List of command line arguments. If None or not given, defaults to reading arguments directly from the process command line (sys.argv).
- plugins (Sequence[str | object] | None) List of plugin objects to be auto-registered during initialization.

Returns

An exit code.

Return type

int | ExitCode

pytest.param

```
param (*values[, id][, marks])
```

Specify a parameter in pytest.mark.parametrize calls or parametrized fixtures.

```
@pytest.mark.parametrize(
    "test_input, expected",
    [
          ("3+5", 8),
          pytest.param("6*9", 42, marks=pytest.mark.xfail),
    ],
)
def test_eval(test_input, expected):
    assert eval(test_input) == expected
```

Parameters

- values (object) Variable args of the values of the parameter set, in order.
- marks (MarkDecorator / Collection [MarkDecorator / Mark]) A single mark or a list of marks to be applied to this parameter set.
- id (str / None) The id to attribute to this parameter set.

pytest.raises

Tutorial: Assertions about expected exceptions

```
with raises (expected_exception: type[E] | tuple[type[E], ...], *, match: str | Pattern[str] | None = ...) \rightarrow RaisesContext[E] as excinfo with raises (expected_exception: type[E] | tuple[type[E], ...], func: Callable[[...], Any], *args: Any, **kwargs: Any) \rightarrow ExceptionInfo[E] as excinfo
```

Assert that a code block/function call raises an exception type, or one of its subclasses.

Parameters

- **expected_exception** The expected exception type, or a tuple if one of multiple possible exception types are expected. Note that subclasses of the passed exceptions will also match.
- match (str | re.Pattern[str] | None) If specified, a string containing a regular expression, or a regular expression object, that is tested against the string representation of the exception and its PEP 678 __notes__ using re.search().

To match a literal string that may contain special characters, the pattern can first be escaped with resease().

(This is only used when pytest.raises is used as a context manager, and passed through to the function otherwise. When using pytest.raises as a function, you can use: pytest.raises(Exc, func, match="passed on").match("my pattern").)

Use pytest.raises as a context manager, which will capture the exception of the given type, or any of its subclasses:

```
>>> import pytest
>>> with pytest.raises(ZeroDivisionError):
... 1/0
```

If the code block does not raise the expected exception (ZeroDivisionError in the example above), or no exception at all, the check will fail instead.

You can also use the keyword argument match to assert that the exception matches a text or regex:

```
>>> with pytest.raises(ValueError, match='must be 0 or None'):
... raise ValueError("value must be 0 or None")
>>> with pytest.raises(ValueError, match=r'must be \d+$'):
... raise ValueError("value must be 42")
```

The match argument searches the formatted exception string, which includes any PEP-678 __notes__:

The context manager produces an *ExceptionInfo* object which can be used to inspect the details of the captured exception:

```
>>> with pytest.raises(ValueError) as exc_info:
... raise ValueError("value must be 42")
>>> assert exc_info.type is ValueError
>>> assert exc_info.value.args[0] == "value must be 42"
```

A Warning

Given that pytest.raises matches subclasses, be wary of using it to match Exception like this:

Because Exception is the base class of almost all exceptions, it is easy for this to hide real bugs, where the user wrote this expecting a specific exception, but some other exception is being raised due to a bug introduced during a refactoring.

Avoid using pytest.raises to catch Exception unless certain that you really want to catch any exception raised.

1 Note

When using pytest.raises as a context manager, it's worthwhile to note that normal context manager rules apply and that the exception raised *must* be the final line in the scope of the context manager. Lines of code after that, within the scope of the context manager will not be executed. For example:

```
>>> value = 15
>>> with pytest.raises(ValueError) as exc_info:
... if value > 10:
... raise ValueError("value must be <= 10")
... assert exc_info.type is ValueError # This will not execute.</pre>
```

Instead, the following approach must be taken (note the difference in scope):

```
>>> with pytest.raises(ValueError) as exc_info:
... if value > 10:
... raise ValueError("value must be <= 10")
...
>>> assert exc_info.type is ValueError
```

Using with pytest.mark.parametrize

When using *pytest.mark.parametrize* it is possible to parametrize tests such that some runs raise an exception and others do not.

See Parametrizing conditional raising for an example.

→ See also

Assertions about expected exceptions for more examples and detailed discussion.

Legacy form

It is possible to specify a callable by passing a to-be-called lambda:

```
>>> raises(ZeroDivisionError, lambda: 1/0)
<ExceptionInfo ...>
```

or you can specify an arbitrary callable with arguments:

```
>>> def f(x): return 1/x
...
>>> raises(ZeroDivisionError, f, 0)
<ExceptionInfo ...>
>>> raises(ZeroDivisionError, f, x=0)
<ExceptionInfo ...>
```

The form above is fully supported but discouraged for new code because the context manager form is regarded as more readable and less error-prone.

1 Note

Similar to caught exception objects in Python, explicitly clearing local references to returned Exception—Info objects can help the Python interpreter speed up its garbage collection.

Clearing those references breaks a reference cycle (ExceptionInfo -> caught exception -> frame stack raising the exception -> current frame stack -> local variables -> ExceptionInfo) which makes Python keep all objects referenced from that cycle (including all local variables in the current frame) alive until the next cyclic garbage collection run. More detailed information can be found in the official Python documentation for the try statement.

pytest.deprecated_call

Tutorial: Ensuring code triggers a deprecation warning

```
with deprecated_call (*, match: str \mid Pattern[str] \mid None = ...) \rightarrow WarningsRecorder with deprecated_call (func: Callable[[...], T], *args: Any, **kwargs: Any) \rightarrow T
```

Assert that code produces a DeprecationWarning or PendingDeprecationWarning or Future-Warning.

This function can be used as a context manager:

It can also be used by passing a function and *args and **kwargs, in which case it will ensure calling func(*args, **kwargs) produces one of the warnings types above. The return value is the return value of the function.

In the context manager form you may use the keyword argument match to assert that the warning matches a text or regex.

The context manager produces a list of warnings. WarningMessage objects, one for each warning raised.

pytest.register assert rewrite

Tutorial: Assertion Rewriting

```
register_assert_rewrite(*names)
```

Register one or more module names to be rewritten on import.

This function will make sure that this module or all modules inside the package will get their assert statements rewritten. Thus you should make sure to call this before the module is actually imported, usually in your __init__.py if you are a plugin using a package.

Parameters

names (str) – The module names to register.

pytest.warns

Tutorial: Asserting warnings with the warns function

**kwargs: Any) $\rightarrow T$

Assert that code raises a particular class of warning.

Specifically, the parameter expected_warning can be a warning class or tuple of warning classes, and the code inside the with block must issue at least one warning of that class or classes.

This helper produces a list of warnings. WarningMessage objects, one for each warning emitted (regardless of whether it is an expected_warning or not). Since pytest 8.0, unmatched warnings are also re-emitted when the context closes.

This function can be used as a context manager:

```
>>> import pytest
>>> with pytest.warns(RuntimeWarning):
... warnings.warn("my warning", RuntimeWarning)
```

In the context manager form you may use the keyword argument match to assert that the warning matches a text or regex:

```
>>> with pytest.warns(UserWarning, match='must be 0 or None'):
... warnings.warn("value must be 0 or None", UserWarning)
>>> with pytest.warns(UserWarning, match=r'must be \d+$'):
... warnings.warn("value must be 42", UserWarning)
>>> with pytest.warns(UserWarning): # catch re-emitted warning
... with pytest.warns(UserWarning, match=r'must be \d+$'):
... warnings.warn("this is not here", UserWarning)
Traceback (most recent call last):
...
Failed: DID NOT WARN. No warnings of type ...UserWarning... were emitted...
```

Using with pytest.mark.parametrize

When using *pytest.mark.parametrize* it is possible to parametrize tests such that some runs raise a warning and others do not.

This could be achieved in the same way as with exceptions, see *Parametrizing conditional raising* for an example.

pytest.freeze_includes

Tutorial: Freezing pytest

freeze_includes()

Return a list of module names used by pytest that should be included by cx_freeze.

3.4.3 Marks

Marks can be used to apply metadata to test functions (but not fixtures), which can then be accessed by fixtures or plugins.

pytest.mark.filterwarnings

Tutorial: @pytest.mark.filterwarnings

Add warning filters to marked test items.

```
pytest.mark.filterwarnings(filter)
```

Parameters

filter (*str*) - A warning specification string, which is composed of contents of the tuple (action, message, category, module, lineno) as specified in The Warnings Filter section of the Python documentation, separated by ":". Optional fields can be omitted. Module names passed for filtering are not regex-escaped.

For example:

pytest.mark.parametrize

Tutorial: How to parametrize fixtures and test functions

This mark has the same signature as pytest. Metafunc.parametrize(); see there.

pytest.mark.skip

Tutorial: Skipping test functions

Unconditionally skip a test function.

```
pytest.mark.skip(reason=None)
```

Parameters

reason (str) – Reason why the test function is being skipped.

pytest.mark.skipif

Tutorial: Skipping test functions

Skip a test function if a condition is True.

```
pytest.mark.skipif(condition, *, reason=None)
```

Parameters

- condition (bool or str) True/False if the condition should be skipped or a condition string.
- ${\tt reason}\,({\tt str})$ Reason why the test function is being skipped.

pytest.mark.usefixtures

Tutorial: Use fixtures in classes and modules with usefixtures

Mark a test function as using the given fixture names.

```
pytest.mark.usefixtures(*names)
```

Parameters

args – The names of the fixture to use, as strings.



When using usefixtures in hooks, it can only load fixtures when applied to a test function before test setup (for example in the pytest_collection_modifyitems hook).

Also note that this mark has no effect when applied to **fixtures**.

pytest.mark.xfail

Tutorial: XFail: mark test functions as expected to fail

Marks a test function as *expected to fail*.

pytest.mark.xfail(condition=False, *, reason=None, raises=None, run=True, strict=xfail strict)

Parameters

- condition (Union[bool, str]) Condition for marking the test function as xfail (True/False or a condition string). If a bool, you also have to specify reason (see condition string).
- **reason** (*str*) Reason why the test function is marked as xfail.
- raises (Type[Exception]) Exception class (or tuple of classes) expected to be raised by the test function; other exceptions will fail the test. Note that subclasses of the classes passed will also result in a match (similar to how the except statement works).
- run (bool) Whether the test function should actually be executed. If False, the function will always xfail and will not be executed (useful if a function is segfaulting).
- strict (bool) -
 - If False the function will be shown in the terminal output as xfailed if it fails and as xpass if it passes. In both cases this will not cause the test suite to fail as a whole. This is particularly useful to mark *flaky* tests (tests that fail at random) to be tackled later.
 - If True, the function will be shown in the terminal output as xfailed if it fails, but if it unexpectedly passes then it will fail the test suite. This is particularly useful to mark functions that are always failing and there should be a clear indication if they unexpectedly start to pass (for example a new release of a library fixes a known bug).

Defaults to xfail_strict, which is False by default.

Custom marks

Marks are created dynamically using the factory object pytest.mark and applied as a decorator.

For example:

```
@pytest.mark.timeout(10, "slow", method="thread")
def test_function(): ...
```

Will create and attach a *Mark* object to the collected *Item*, which can then be accessed by fixtures or hooks with *Node.iter_markers*. The mark object will have the following attributes:

```
mark.args == (10, "slow")
mark.kwargs == {"method": "thread"}
```

Example for using multiple custom markers:

```
@pytest.mark.timeout(10, "slow", method="thread")
@pytest.mark.slow
def test_function(): ...
```

When <code>Node.iter_markers</code> or <code>Node.iter_markers_with_node</code> is used with multiple markers, the marker closest to the function will be iterated over first. The above example will result in <code>@pytest.mark.slow</code> followed by <code>@pytest.mark.timeout(...)</code>.

3.4.4 Fixtures

Tutorial: *Fixtures reference*

Fixtures are requested by test functions or other fixtures by declaring them as argument names.

Example of a test requiring a fixture:

```
def test_output(capsys):
    print("hello")
    out, err = capsys.readouterr()
    assert out == "hello\n"
```

Example of a fixture requiring another fixture:

```
@pytest.fixture
def db_session(tmp_path):
    fn = tmp_path / "db.file"
    return connect(fn)
```

For more details, consult the full fixtures docs.

@pytest.fixture

```
@fixture (fixture_function: FixtureFunction, *, scope: Literal['session', 'package', 'module', 'class', 'function'] |

Callable[[str, Config], Literal['session', 'package', 'module', 'class', 'function']] = 'function', params:

Iterable[object] | None = None, autouse: bool = False, ids: Sequence[object | None] | Callable[[Any], object | None] | None = None, name: str | None = None) → FixtureFunction
```

Decorator to mark a fixture factory function.

This decorator can be used, with or without parameters, to define a fixture function.

The name of the fixture function can later be referenced to cause its invocation ahead of running tests: test modules or classes can use the pytest.mark.usefixtures (fixturename) marker.

Test functions can directly use fixture names as input arguments in which case the fixture instance returned from the fixture function will be injected.

Fixtures can provide their values to test functions using return or yield statements. When using yield the code block after the yield statement is executed as teardown code regardless of the test outcome, and must yield exactly once.

Parameters

• scope - The scope for which this fixture is shared; one of "function" (default), "class", "module", "package" or "session".

This parameter may also be a callable which receives (fixture_name, config) as parameters, and must return a str with one of the values mentioned above.

See *Dynamic scope* in the docs for more information.

- params An optional list of parameters which will cause multiple invocations of the fixture function and all of the tests using it. The current parameter is available in request .param.
- **autouse** If True, the fixture func is activated for all tests that can see it. If False (the default), an explicit reference is needed to activate the fixture.
- ids Sequence of ids each corresponding to the params so that they are part of the test id. If no ids are provided they will be generated automatically from the params.
- name The name of the fixture. This defaults to the name of the decorated function. If a fixture is used in the same module in which it is defined, the function name of the fixture will be shadowed by the function arg that requests the fixture; one way to resolve this is to name the decorated function fixture_<fixturename> and then use @pytest. fixture(name='<fixturename>').

capfd

Tutorial: How to capture stdout/stderr output

capfd()

Enable text capturing of writes to file descriptors 1 and 2.

The captured output is made available via capfd.readouterr() method calls, which return a (out, err) namedtuple. out and err will be text objects.

Returns an instance of CaptureFixture[str].

Example:

```
def test_system_echo(capfd):
    os.system('echo "hello"')
    captured = capfd.readouterr()
    assert captured.out == "hello\n"
```

capfdbinary

Tutorial: How to capture stdout/stderr output

capfdbinary()

Enable bytes capturing of writes to file descriptors 1 and 2.

The captured output is made available via capfd.readouterr() method calls, which return a (out, err) namedtuple. out and err will be byte objects.

Returns an instance of CaptureFixture[bytes].

Example:

```
def test_system_echo(capfdbinary):
    os.system('echo "hello"')
    captured = capfdbinary.readouterr()
    assert captured.out == b"hello\n"
```

caplog

Tutorial: How to manage logging

caplog()

Access and control log capturing.

Captured logs are available through the following properties/methods:

Returns a pytest.LogCaptureFixture instance.

final class LogCaptureFixture

Provides access and control of log capturing.

property handler: LogCaptureHandler

Get the logging handler used by the fixture.

```
get_records (when)
```

Get the logging records for one of the possible test phases.

Parameters

```
when (Literal['setup', 'call', 'teardown']) - Which test phase to obtain the records from. Valid values are: "setup", "call" and "teardown".
```

Returns

The list of captured records at the given stage.

Return type

list[*LogRecord*]

Added in version 3.4.

property text: str

The formatted log text.

property records: list[LogRecord]

The list of log records.

```
property record_tuples: list[tuple[str, int, str]]
```

A list of a stripped down version of log records intended for use in assertion comparison.

The format of the tuple is:

```
(logger_name, log_level, message)
```

property messages: list[str]

A list of format-interpolated log messages.

Unlike 'records', which contains the format string and parameters for interpolation, log messages in this list are all interpolated.

Unlike 'text', which contains the output from the handler, log messages in this list are unadorned with levels, timestamps, etc, making exact comparisons more reliable.

Note that traceback or stack info (from logging.exception() or the exc_info or stack_info arguments to the logging functions) is not included, as this is added by the formatter in the handler.

Added in version 3.7.

clear()

Reset the list of log records and the captured log text.

```
set_level (level, logger=None)
```

Set the threshold level of a logger for the duration of a test.

Logging messages which are less severe than this level will not be captured.

Changed in version 3.4: The levels of the loggers changed by this function will be restored to their initial values at the end of the test.

Will enable the requested logging level if it was disabled via logging.disable().

Parameters

- level (int / str) The level.
- logger (str / None) The logger to update. If not given, the root logger.

```
with at_level(level, logger=None)
```

Context manager that sets the level for capturing of logs. After the end of the 'with' statement the level is restored to its original value.

Will enable the requested logging level if it was disabled via logging.disable().

Parameters

- level (int | str) The level.
- logger (str / None) The logger to update. If not given, the root logger.

```
with filtering(filter_)
```

Context manager that temporarily adds the given filter to the caplog's <code>handler()</code> for the 'with' statement block, and removes that filter at the end of the block.

Parameters

```
filter - A custom logging. Filter object.
```

Added in version 7.5.

capsys

Tutorial: How to capture stdout/stderr output

```
capsys()
```

Enable text capturing of writes to sys.stdout and sys.stderr.

The captured output is made available via capsys.readouterr() method calls, which return a (out, err) namedtuple. out and err will be text objects.

Returns an instance of CaptureFixture[str].

Example:

```
def test_output(capsys):
    print("hello")
    captured = capsys.readouterr()
    assert captured.out == "hello\n"
```

class CaptureFixture

Object returned by the capsys, capsysbinary, capfd and capfdbinary fixtures.

readouterr()

Read and return the captured output so far, resetting the internal buffer.

Returns

The captured content as a namedtuple with out and err string attributes.

Return type

CaptureResult

with disabled()

Temporarily disable capturing while inside the with block.

capsysbinary

Tutorial: How to capture stdout/stderr output

```
capsysbinary()
```

Enable bytes capturing of writes to sys.stdout and sys.stderr.

The captured output is made available via capsysbinary.readouterr() method calls, which return a (out, err) namedtuple. out and err will be bytes objects.

Returns an instance of CaptureFixture[bytes].

Example:

```
def test_output(capsysbinary):
    print("hello")
    captured = capsysbinary.readouterr()
    assert captured.out == b"hello\n"
```

config.cache

Tutorial: How to re-run failed tests and maintain state between test runs

The config.cache object allows other plugins and fixtures to store and retrieve values across test runs. To access it from fixtures request pytestconfig into your fixture and get it with pytestconfig.cache.

Under the hood, the cache plugin uses the simple dumps/loads API of the json stdlib module.

config.cache is an instance of pytest.Cache:

final class Cache

Instance of the cache fixture.

```
mkdir (name)
```

Return a directory path object with the given name.

If the directory does not yet exist, it will be created. You can use it to manage files to e.g. store/retrieve database dumps across test sessions.

Added in version 7.0.

Parameters

name (str) – Must be a string not containing a / separator. Make sure the name contains your plugin or application identifiers to prevent clashes with other cache users.

```
get (key, default)
```

Return the cached value for the given key.

If no value was yet cached or the value cannot be read, the specified default is returned.

Parameters

- **key** (str) Must be a / separated value. Usually the first name is the name of your plugin or your application.
- **default** The value to return in case of a cache-miss or invalid cache value.

```
set (key, value)
```

Save value for the given key.

Parameters

- **key** (str) Must be a / separated value. Usually the first name is the name of your plugin or your application.
- **value** (object) Must be of any combination of basic python types, including nested types like lists of dictionaries.

doctest_namespace

Tutorial: How to run doctests

doctest_namespace()

Fixture that returns a dict that will be injected into the namespace of doctests.

Usually this fixture is used in conjunction with another autouse fixture:

```
@pytest.fixture(autouse=True)
def add_np(doctest_namespace):
    doctest_namespace["np"] = numpy
```

For more details: 'doctest_namespace' fixture.

monkeypatch

Tutorial: How to monkeypatch/mock modules and environments

monkeypatch()

A convenient fixture for monkey-patching.

The fixture provides these methods to modify objects, dictionaries, or os.environ:

- monkeypatch.setattr(obj, name, value, raising=True)
- monkeypatch.delattr(obj, name, raising=True)
- monkeypatch.setitem(mapping, name, value)
- monkeypatch.delitem(obj, name, raising=True)

- monkeypatch.setenv(name, value, prepend=None)
- monkeypatch.delenv(name, raising=True)
- monkeypatch.syspath_prepend(path)
- monkeypatch.chdir(path)
- monkeypatch.context()

All modifications will be undone after the requesting test function or fixture has finished. The raising parameter determines if a KeyError or AttributeError will be raised if the set/deletion operation does not have the specified target.

To undo modifications done by the fixture in a contained scope, use context ().

Returns a MonkeyPatch instance.

final class MonkeyPatch

Helper to conveniently monkeypatch attributes/items/environment variables/syspath.

Returned by the monkeypatch fixture.

Changed in version 6.2: Can now also be used directly as pytest.MonkeyPatch(), for when the fixture is not available. In this case, use with MonkeyPatch.context() as mp: or remember to call undo() explicitly.

classmethod with context()

Context manager that returns a new *MonkeyPatch* object which undoes any patching done inside the with block upon exit.

Example:

```
import functools

def test_partial(monkeypatch):
    with monkeypatch.context() as m:
        m.setattr(functools, "partial", 3)
```

Useful in situations where it is desired to undo some patches before the test ends, such as mocking stdlib functions that might break pytest itself if mocked (for examples of this see #3290).

```
\textbf{setattr} \ (\textit{target: str}, \textit{name: object, value: } \sim \_\textit{pytest.monkeypatch.Notset} = <\textit{notset>}, \textit{raising: bool} = \textit{True}) \ \rightarrow \ \text{None}
```

```
setattr (target: object, name: str, value: object, raising: bool = True) \rightarrow None
```

Set attribute value on target, memorizing the old value.

For example:

```
import os
monkeypatch.setattr(os, "getcwd", lambda: "/")
```

The code above replaces the os.getcwd() function by a lambda which always returns "/".

For convenience, you can specify a string as target which will be interpreted as a dotted import path, with the last part being the attribute name:

```
monkeypatch.setattr("os.getcwd", lambda: "/")
```

Raises AttributeError if the attribute does not exist, unless raising is set to False.

Where to patch

monkeypatch.setattr works by (temporarily) changing the object that a name points to with another one. There can be many names pointing to any individual object, so for patching to work you must ensure that you patch the name used by the system under test.

See the section Where to patch in the unittest.mock docs for a complete explanation, which is meant for unittest.mock.patch() but applies to monkeypatch.setattr as well.

```
delattr (target, name=<notset>, raising=True)
```

Delete attribute name from target.

If no name is specified and target is a string it will be interpreted as a dotted import path with the last part being the attribute name.

Raises AttributeError it the attribute does not exist, unless raising is set to False.

```
setitem (dic, name, value)
```

Set dictionary entry name to value.

```
delitem (dic, name, raising=True)
```

Delete name from dict.

Raises KeyError if it doesn't exist, unless raising is set to False.

```
setenv (name, value, prepend=None)
```

Set environment variable name to value.

If prepend is a character, read the current environment variable value and prepend the value adjoined with the prepend character.

```
delenv (name, raising=True)
```

Delete name from the environment.

Raises KeyError if it does not exist, unless raising is set to False.

syspath_prepend(path)

Prepend path to sys.path list of import locations.

chdir (path)

Change the current working directory to the specified path.

Parameters

path (str / PathLike[str]) - The path to change into.

undo()

Undo previous changes.

This call consumes the undo stack. Calling it a second time has no effect unless you do more monkeypatching after the undo call.

There is generally no need to call undo (), since it is called automatically during tear-down.



1 Note

The same monkeypatch fixture is used across a single test function invocation. If monkeypatch is used both by the test function itself and one of the test fixtures, calling undo () will undo all of the changes made in both functions.

Prefer to use context () instead.

pytestconfig

pytestconfig()

Session-scoped fixture that returns the session's pytest.Config object.

Example:

```
def test_foo(pytestconfig):
    if pytestconfig.get_verbosity() > 0:
```

pytester

Added in version 6.2.

Provides a Pytester instance that can be used to run and test pytest itself.

It provides an empty directory where pytest can be executed in isolation, and contains facilities to write tests, configuration files, and match against expected output.

To use it, include in your topmost conftest.py file:

```
pytest_plugins = "pytester"
```

final class Pytester

Facilities to write tests/configuration files, execute pytest in isolation, and match against expected output, perfect for black-box testing of pytest plugins.

It attempts to isolate the test run from external factors as much as possible, modifying the current working directory to path and environment variables during initialization.

exception TimeoutExpired

```
plugins: list[str | object]
```

A list of plugins to use with <code>parseconfig()</code> and <code>runpytest()</code>. Initially this is an empty list but plugins can be added to the list. The type of items to add to the list depends on the method using them so refer to them for details.

property path: Path

Temporary directory path used to create files/run tests from, etc.

make_hook_recorder (pluginmanager)

Create a new HookRecorder for a PytestPluginManager.

chdir()

Cd into the temporary directory.

This is done automatically upon instantiation.

```
makefile(ext, *args, **kwargs)
```

Create new text file(s) in the test directory.

Parameters

- **ext** (str) The extension the file(s) should use, including the dot, e.g. .py.
- **args** (str) All args are treated as strings and joined using newlines. The result is written as contents to the file. The name of the file is based on the test function requesting this fixture.
- **kwargs** (str) Each keyword is the name of a file, while the value of it will be written as contents of the file.

Returns

The first created file.

Return type

Path

Examples:

```
pytester.makefile(".txt", "line1", "line2")

pytester.makefile(".ini", pytest="[pytest]\naddopts=-rs\n")
```

To create binary files, use pathlib.Path.write_bytes() directly:

```
filename = pytester.path.joinpath("foo.bin")
filename.write_bytes(b"...")
```

makeconftest (source)

Write a conftest.py file.

Parameters

source (str) – The contents.

Returns

The conftest.py file.

Return type

Path

```
makeini(source)
```

Write a tox.ini file.

Parameters

source (str) – The contents.

Returns

The tox.ini file.

Return type

Path

getinicfg(source)

Return the pytest section from the tox.ini config file.

makepyprojecttoml (source)

Write a pyproject.toml file.

Parameters

source (str) – The contents.

Returns

The pyproject.ini file.

Return type

Path

Added in version 6.0.

```
makepyfile (*args, **kwargs)
```

Shortcut for .makefile() with a .py extension.

Defaults to the test name with a '.py' extension, e.g test_foobar.py, overwriting existing files.

Examples:

```
def test_something(pytester):
    # Initial file is created test_something.py.
    pytester.makepyfile("foobar")
    # To create multiple files, pass kwargs accordingly.
    pytester.makepyfile(custom="foobar")
    # At this point, both 'test_something.py' & 'custom.py' exist in the test_____
directory.
```

maketxtfile (*args, **kwargs)

Shortcut for .makefile() with a .txt extension.

Defaults to the test name with a '.txt' extension, e.g test_foobar.txt, overwriting existing files.

Examples:

```
def test_something(pytester):
    # Initial file is created test_something.txt.
    pytester.maketxtfile("foobar")
    # To create multiple files, pass kwargs accordingly.
    pytester.maketxtfile(custom="foobar")
```

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```
# At this point, both 'test_something.txt' & 'custom.txt' exist in the \rightarrow test directory.
```

syspathinsert (path=None)

Prepend a directory to sys.path, defaults to path.

This is undone automatically when this object dies at the end of each test.

Parameters

```
path (str | PathLike[str] | None) - The path.
```

mkdir (name)

Create a new (sub)directory.

Parameters

name (str | PathLike[str]) - The name of the directory, relative to the pytester path.

Returns

The created directory.

Return type

pathlib.Path

mkpydir (name)

Create a new python package.

This creates a (sub)directory with an empty __init__.py file so it gets recognised as a Python package.

copy_example (name=None)

Copy file from project's directory into the testdir.

Parameters

```
name (str / None) - The name of the file to copy.
```

Returns

Path to the copied directory (inside self.path).

Return type

pathlib.Path

getnode (config, arg)

Get the collection node of a file.

Parameters

- config (Config) A pytest config. See parseconfig() and parseconfigure() for creating it.
- arg(str / PathLike[str]) Path to the file.

Returns

The node.

Return type

Collector | Item

getpathnode (path)

Return the collection node of a file.

This is like getnode () but uses parseconfigure () to create the (configured) pytest Config instance.

Parameters

```
path (str | PathLike[str]) - Path to the file.
```

Returns

The node.

Return type

Collector | Item

genitems (colitems)

Generate all test items from a collection node.

This recurses into the collection node and returns a list of all the test items contained within.

Parameters

```
colitems (Sequence[Item / Collector]) - The collection nodes.
```

Returns

The collected items.

Return type

list[Item]

runitem(source)

Run the "test func" Item.

The calling test instance (class containing the test method) must provide a .getrunner() method which should return a runner which can run the test protocol for a single item, e.g. _pytest.runner.runtestprotocol.

inline_runsource (source, *cmdlineargs)

Run a test module in process using pytest.main().

This run writes "source" into a temporary file and runs pytest.main() on it, returning a <code>HookRecorder</code> instance for the result.

Parameters

- **source** (*str*) The source code of the test module.
- **cmdlineargs** Any extra command line arguments to use.

inline_genitems (*args)

```
Run pytest.main(['--collect-only']) in-process.
```

Runs the pytest.main() function to run all of pytest inside the test process itself like inline_run(), but returns a tuple of the collected items and a HookRecorder instance.

```
inline_run (*args, plugins=(), no_reraise_ctrlc=False)
```

Run pytest.main() in-process, returning a HookRecorder.

Runs the <code>pytest.main()</code> function to run all of pytest inside the test process itself. This means it can return a <code>HookRecorder</code> instance which gives more detailed results from that run than can be done by matching stdout/stderr from <code>runpytest()</code>.

Parameters

- args (str / PathLike[str]) Command line arguments to pass to pytest. main().
- plugins Extra plugin instances the pytest.main() instance should use.
- no_reraise_ctrlc (bool) Typically we reraise keyboard interrupts from the child run. If True, the KeyboardInterrupt exception is captured.

```
runpytest_inprocess(*args, **kwargs)
```

Return result of running pytest in-process, providing a similar interface to what self.runpytest() provides.

```
runpytest (*args, **kwargs)
```

Run pytest inline or in a subprocess, depending on the command line option "-runpytest" and return a Run-Result.

parseconfig(*args)

Return a new pytest pytest.Config instance from given commandline args.

This invokes the pytest bootstrapping code in _pytest.config to create a new pytest. PytestPluginManager and call the pytest_cmdline_parse hook to create a new pytest. Config instance.

If plugins has been populated they should be plugin modules to be registered with the plugin manager.

parseconfigure(*args)

Return a new pytest configured Config instance.

Returns a new pytest.Config instance like parseconfig(), but also calls the pytest_configure hook.

```
getitem (source, funcname='test_func')
```

Return the test item for a test function.

Writes the source to a python file and runs pytest's collection on the resulting module, returning the test item for the requested function name.

Parameters

- **source** (str | PathLike[str]) The module source.
- **funchame** (str) The name of the test function for which to return a test item.

Returns

The test item.

Return type

Item

getitems (source)

Return all test items collected from the module.

Writes the source to a Python file and runs pytest's collection on the resulting module, returning all test items contained within.

```
getmodulecol (source, configurgs=(), *, withinit=False)
```

Return the module collection node for source.

Writes source to a file using <code>makepyfile()</code> and then runs the pytest collection on it, returning the collection node for the test module.

Parameters

- **source** (str | PathLike[str]) The source code of the module to collect.
- configargs Any extra arguments to pass to parseconfigure ().
- withinit (bool) Whether to also write an __init__.py file to the same directory to ensure it is a package.

```
collect_by_name (modcol, name)
```

Return the collection node for name from the module collection.

Searches a module collection node for a collection node matching the given name.

Parameters

- modcol (Collector) A module collection node; see getmodulecol().
- name (str) The name of the node to return.

```
popen (cmdargs, stdout=-1, stderr=-1, stdin=NotSetType.token, **kw)
```

Invoke subprocess. Popen.

Calls subprocess. Popen making sure the current working directory is in PYTHONPATH.

You probably want to use run () instead.

run (*cmdargs, timeout=None, stdin=NotSetType.token)

Run a command with arguments.

Run a process using subprocess. Popen saving the stdout and stderr.

Parameters

- **cmdargs** (str / PathLike[str]) The sequence of arguments to pass to subprocess. Popen, with path-like objects being converted to str automatically.
- timeout (float | None) The period in seconds after which to timeout and raise Pytester. TimeoutExpired.
- **stdin** (_pytest.compat.NotSetType | bytes | IO[Any] | int) Optional standard input.
 - If it is CLOSE_STDIN (Default), then this method calls subprocess.Popen with stdin=subprocess.PIPE, and the standard input is closed immediately after the new command is started.
 - If it is of type bytes, these bytes are sent to the standard input of the command.
 - Otherwise, it is passed through to subprocess. Popen. For further information in this case, consult the document of the stdin parameter in subprocess. Popen.

Returns

The result.

Return type

RunResult

runpython (script)

Run a python script using sys.executable as interpreter.

runpython_c (command)

```
Run python -c "command".
```

runpytest_subprocess (*args, timeout=None)

Run pytest as a subprocess with given arguments.

Any plugins added to the *plugins* list will be added using the -p command line option. Additionally --basetemp is used to put any temporary files and directories in a numbered directory prefixed with "runpytest-" to not conflict with the normal numbered pytest location for temporary files and directories.

Parameters

- args (str / PathLike[str]) The sequence of arguments to pass to the pytest subprocess.
- timeout (float | None) The period in seconds after which to timeout and raise Pytester. Timeout Expired.

Returns

The result.

Return type

RunResult

```
spawn_pytest (string, expect_timeout=10.0)
```

Run pytest using pexpect.

This makes sure to use the right pytest and sets up the temporary directory locations.

The pexpect child is returned.

```
spawn (cmd, expect_timeout=10.0)
```

Run a command using pexpect.

The pexpect child is returned.

final class RunResult

The result of running a command from Pytester.

```
ret: int | ExitCode
```

The return value.

outlines

List of lines captured from stdout.

errlines

List of lines captured from stderr.

stdout

LineMatcher of stdout.

Use e.g. str(stdout) to reconstruct stdout, or the commonly used $stdout.fnmatch_lines()$ method.

stderr

LineMatcher of stderr.

duration

Duration in seconds.

parseoutcomes()

Return a dictionary of outcome noun -> count from parsing the terminal output that the test process produced.

The returned nouns will always be in plural form:

```
====== 1 failed, 1 passed, 1 warning, 1 error in 0.13s ====
```

```
Will return { "failed": 1, "passed": 1, "warnings": 1, "errors": 1}.
```

classmethod parse_summary_nouns(lines)

Extract the nouns from a pytest terminal summary line.

It always returns the plural noun for consistency:

```
====== 1 failed, 1 passed, 1 warning, 1 error in 0.13s ====
```

```
Will return { "failed": 1, "passed": 1, "warnings": 1, "errors": 1}.
```

Assert that the specified outcomes appear with the respective numbers (0 means it didn't occur) in the text output from a test run.

warnings and deselected are only checked if not None.

class LineMatcher

Flexible matching of text.

This is a convenience class to test large texts like the output of commands.

The constructor takes a list of lines without their trailing newlines, i.e. text.splitlines().

```
__str__()
```

Return the entire original text.

Added in version 6.2: You can use str() in older versions.

fnmatch_lines_random(lines2)

Check lines exist in the output in any order (using fnmatch.fnmatch()).

```
re_match_lines_random(lines2)
```

Check lines exist in the output in any order (using re.match()).

```
get_lines_after (fnline)
```

Return all lines following the given line in the text.

The given line can contain glob wildcards.

```
fnmatch_lines(lines2, *, consecutive=False)
```

Check lines exist in the output (using fnmatch.fnmatch()).

The argument is a list of lines which have to match and can use glob wildcards. If they do not match a pytest.fail() is called. The matches and non-matches are also shown as part of the error message.

Parameters

- lines2 (Sequence[str]) String patterns to match.
- **consecutive** (bool) Match lines consecutively?

```
re_match_lines (lines2, *, consecutive=False)
```

Check lines exist in the output (using re.match()).

The argument is a list of lines which have to match using re.match. If they do not match a pytest.fail() is called.

The matches and non-matches are also shown as part of the error message.

Parameters

- lines2 (Sequence[str]) string patterns to match.
- **consecutive** (bool) match lines consecutively?

```
no_fnmatch_line(pat)
```

Ensure captured lines do not match the given pattern, using fnmatch.fnmatch.

Parameters

```
pat (str) – The pattern to match lines.
```

```
no_re_match_line (pat)
```

Ensure captured lines do not match the given pattern, using re.match.

Parameters

pat (str) – The regular expression to match lines.

str()

Return the entire original text.

final class HookRecorder

Record all hooks called in a plugin manager.

Hook recorders are created by Pytester.

This wraps all the hook calls in the plugin manager, recording each call before propagating the normal calls.

```
getcalls (names)
```

Get all recorded calls to hooks with the given names (or name).

matchreport (inamepart=", names=('pytest_runtest_logreport', 'pytest_collectreport'), when=None)
Return a testreport whose dotted import path matches.

final class RecordedHookCall

A recorded call to a hook.

The arguments to the hook call are set as attributes. For example:

```
calls = hook_recorder.getcalls("pytest_runtest_setup")
# Suppose pytest_runtest_setup was called once with `item=an_item`.
assert calls[0].item is an_item
```

record property

Tutorial: record_property example

record_property()

Add extra properties to the calling test.

User properties become part of the test report and are available to the configured reporters, like JUnit XML.

The fixture is callable with name, value. The value is automatically XML-encoded.

Example:

```
def test_function(record_property):
    record_property("example_key", 1)
```

record testsuite property

Tutorial: record_testsuite_property example

```
record_testsuite_property()
```

Record a new property> tag as child of the root <testsuite>.

This is suitable to writing global information regarding the entire test suite, and is compatible with xunit2 JUnit family.

This is a session-scoped fixture which is called with (name, value). Example:

```
def test_foo(record_testsuite_property):
    record_testsuite_property("ARCH", "PPC")
    record_testsuite_property("STORAGE_TYPE", "CEPH")
```

Parameters

- name The property name.
- **value** The property value. Will be converted to a string.



Marning

Currently this fixture **does not work** with the pytest-xdist plugin. See #7767 for details.

recwarn

Tutorial: Asserting warnings with the warns function

recwarn()

Return a WarningsRecorder instance that records all warnings emitted by test functions.

See https://docs.pytest.org/en/latest/how-to/capture-warnings.html for information on warning categories.

class WarningsRecorder

A context manager to record raised warnings.

Each recorded warning is an instance of warnings.WarningMessage.

Adapted from warnings.catch_warnings.



1 Note

DeprecationWarning and PendingDeprecationWarning are treated differently; see Ensuring code triggers a deprecation warning.

property list: list[WarningMessage]

The list of recorded warnings.

```
pop (cls=<class 'Warning'>)
```

Pop the first recorded warning which is an instance of cls, but not an instance of a child class of any other match. Raises AssertionError if there is no match.

clear()

Clear the list of recorded warnings.

request

Example: Pass different values to a test function, depending on command line options

The request fixture is a special fixture providing information of the requesting test function.

class FixtureRequest

The type of the request fixture.

A request object gives access to the requesting test context and has a param attribute in case the fixture is parametrized.

fixturename: Final

Fixture for which this request is being performed.

```
property scope: Literal['session', 'package', 'module', 'class',
    'function']
```

Scope string, one of "function", "class", "module", "package", "session".

property fixturenames: list[str]

Names of all active fixtures in this request.

abstract property node

Underlying collection node (depends on current request scope).

property config: Config

The pytest config object associated with this request.

property function

Test function object if the request has a per-function scope.

property cls

Class (can be None) where the test function was collected.

property instance

Instance (can be None) on which test function was collected.

property module

Python module object where the test function was collected.

property path: Path

Path where the test function was collected.

property keywords: MutableMapping[str, Any]

Keywords/markers dictionary for the underlying node.

property session: Session

Pytest session object.

abstractmethod addfinalizer(finalizer)

Add finalizer/teardown function to be called without arguments after the last test within the requesting test context finished execution.

applymarker (marker)

Apply a marker to a single test function invocation.

This method is useful if you don't want to have a keyword/marker on all function invocations.

Parameters

```
marker (str \ / \ MarkDecorator) - An object created by a call to pytest.mark. NAME (...).
```

raiseerror (msg)

Raise a FixtureLookupError exception.

Parameters

```
msg (str | None) - An optional custom error message.
```

getfixturevalue(argname)

Dynamically run a named fixture function.

Declaring fixtures via function argument is recommended where possible. But if you can only decide whether to use another fixture at test setup time, you may use this function to retrieve it inside a fixture or test function body.

This method can be used during the test setup phase or the test run phase, but during the test teardown phase a fixture's value may not be available.

Parameters

```
argname (str) – The fixture name.
```

Raises

pytest.FixtureLookupError - If the given fixture could not be found.

testdir

Identical to pytester, but provides an instance whose methods return legacy py.path.local objects instead when applicable.

New code should avoid using testdir in favor of pytester.

final class Testdir

Similar to Pytester, but this class works with legacy legacy_path objects instead.

All methods just forward to an internal *Pytester* instance, converting results to legacy_path objects as necessary.

```
exception TimeoutExpired
property tmpdir: LocalPath
    Temporary directory where tests are executed.
make_hook_recorder(pluginmanager)
    See Pytester.make_hook_recorder().
chdir()
```

See Pytester.chdir().

```
makefile(ext, *args, **kwargs)
    See Pytester.makefile().
makeconftest (source)
    See Pytester.makeconftest().
makeini (source)
    See Pytester.makeini().
getinicfg(source)
    See Pytester.getinicfg().
makepyprojecttoml (source)
    See Pytester.makepyprojecttoml().
makepyfile (*args, **kwargs)
    See Pytester.makepyfile().
maketxtfile (*args, **kwargs)
    See Pytester.maketxtfile().
syspathinsert (path=None)
    See Pytester.syspathinsert().
mkdir(name)
    See Pytester.mkdir().
mkpydir (name)
    See Pytester.mkpydir().
copy_example (name=None)
    See Pytester.copy_example().
getnode (config, arg)
    See Pytester.getnode().
getpathnode (path)
    See Pytester.getpathnode().
```

```
genitems (colitems)
    See Pytester.genitems().
runitem(source)
    See Pytester.runitem().
inline_runsource (source, *cmdlineargs)
    See Pytester.inline_runsource().
inline_genitems(*args)
    See Pytester.inline_genitems().
inline_run (*args, plugins=(), no_reraise_ctrlc=False)
    See Pytester.inline_run().
runpytest_inprocess(*args, **kwargs)
    See Pytester.runpytest_inprocess().
runpytest (*args, **kwargs)
    See Pytester.runpytest().
parseconfig(*args)
    See Pytester.parseconfig().
parseconfigure (*args)
    See Pytester.parseconfigure().
getitem (source, funcname='test_func')
    See Pytester.getitem().
getitems (source)
    See Pytester.getitems().
getmodulecol (source, configargs=(), withinit=False)
    See Pytester.getmodulecol().
collect_by_name (modcol, name)
    See Pytester.collect_by_name().
popen (cmdargs, stdout=-1, stderr=-1, stdin=NotSetType.token, **kw)
    See Pytester.popen().
run (*cmdargs, timeout=None, stdin=NotSetType.token)
    See Pytester.run().
```

```
runpython(script)
    See Pytester.runpython().

runpython_c(command)
    See Pytester.runpython_c().

runpytest_subprocess(*args, timeout=None)
    See Pytester.runpytest_subprocess().

spawn_pytest(string, expect_timeout=10.0)
    See Pytester.spawn_pytest().

spawn(cmd, expect_timeout=10.0)
    See Pytester.spawn().
```

tmp_path

Tutorial: How to use temporary directories and files in tests

tmp_path()

Return a temporary directory path object which is unique to each test function invocation, created as a sub directory of the base temporary directory.

By default, a new base temporary directory is created each test session, and old bases are removed after 3 sessions, to aid in debugging. This behavior can be configured with $tmp_path_retention_count$ and $tmp_path_retention_policy$. If --basetemp is used then it is cleared each session. See *Temporary directory location and retention*.

The returned object is a pathlib.Path object.

tmp_path_factory

```
Tutorial: The tmp_path_factory fixture
```

tmp_path_factory is an instance of TempPathFactory:

final class TempPathFactory

Factory for temporary directories under the common base temp directory.

The base directory can be configured using the --basetemp option.

```
mktemp (basename, numbered=True)
```

Create a new temporary directory managed by the factory.

Parameters

• **basename** (str) – Directory base name, must be a relative path.

• numbered (bool) - If True, ensure the directory is unique by adding a numbered suffix greater than any existing one: basename="foo-" and numbered=True means that this function will create directories named "foo-0", "foo-1", "foo-2" and so on.

Returns

The path to the new directory.

Return type

Path

getbasetemp()

Return the base temporary directory, creating it if needed.

Returns

The base temporary directory.

Return type

Path

tmpdir

Tutorial: The tmpdir and tmpdir_factory fixtures

tmpdir()

Return a temporary directory path object which is unique to each test function invocation, created as a sub directory of the base temporary directory.

By default, a new base temporary directory is created each test session, and old bases are removed after 3 sessions, to aid in debugging. If --basetemp is used then it is cleared each session. See Temporary directory location and retention.

The returned object is a legacy_path object.



1 Note

These days, it is preferred to use tmp path.

About the tmpdir and tmpdir_factory fixtures.

tmpdir factory

Tutorial: *The tmpdir and tmpdir_factory fixtures*

tmpdir_factory is an instance of TempdirFactory:

final class TempdirFactory

Backward compatibility wrapper that implements py.path.local for TempPathFactory.

1 Note

These days, it is preferred to use tmp_path_factory.

About the tmpdir and tmpdir_factory fixtures.

```
mktemp (basename, numbered=True)
```

Same as TempPathFactory.mktemp(), but returns a py.path.local object.

getbasetemp()

Same as TempPathFactory.getbasetemp(), but returns a py.path.local object.

3.4.5 Hooks

Tutorial: Writing plugins

Reference to all hooks which can be implemented by conftest.py files and plugins.

@pytest.hookimpl

```
@pytest.hookimpl
```

pytest's decorator for marking functions as hook implementations.

See Writing hook functions and pluggy. HookimplMarker().

@pytest.hookspec

```
@pytest.hookspec
```

pytest's decorator for marking functions as hook specifications.

See Declaring new hooks and pluggy. HookspecMarker().

Bootstrapping hooks

Bootstrapping hooks called for plugins registered early enough (internal and third-party plugins).

```
pytest_load_initial_conftests (early_config, parser, args)
```

Called to implement the loading of initial conftest files ahead of command line option parsing.

Parameters

- early_config (Config) The pytest config object.
- args (list[str]) Arguments passed on the command line.
- parser (Parser) To add command line options.

This hook is not called for conftest files.

pytest_cmdline_parse (pluginmanager, args)

Return an initialized *Config*, parsing the specified args.

Stops at first non-None result, see firstresult: stop at first non-None result.



This hook is only called for plugin classes passed to the plugins arg when using pytest.main to perform an in-process test run.

Parameters

- pluginmanager (PytestPluginManager) The pytest plugin manager.
- **args** (list[str]) List of arguments passed on the command line.

Returns

A pytest config object.

Return type

Config | None

Use in conftest plugins

This hook is not called for conftest files.

```
pytest_cmdline_main(config)
```

Called for performing the main command line action.

The default implementation will invoke the configure hooks and pytest_runtestloop.

Stops at first non-None result, see firstresult: stop at first non-None result.

Parameters

```
config (Config) – The pytest config object.
```

Returns

The exit code.

Return type

ExitCode | int | None

Use in conftest plugins

This hook is only called for *initial conftests*.

Initialization hooks

Initialization hooks called for plugins and conftest.py files.

pytest_addoption (parser, pluginmanager)

Register argparse-style options and ini-style config values, called once at the beginning of a test run.

Parameters

- parser (Parser) To add command line options, call parser.addoption(...). To add ini-file values call parser.addini (...).
- pluginmanager (PytestPluginManager) The pytest plugin manager, which can be used to install hookspec()'s or hookimpl()'s and allow one plugin to call another plugin's hooks to change how command line options are added.

Options can later be accessed through the *confiq* object, respectively:

- config.getoption (name) to retrieve the value of a command line option.
- config.getini (name) to retrieve a value read from an ini-style file.

The config object is passed around on many internal objects via the .config attribute or can be retrieved as the pytestconfig fixture.



This hook is incompatible with hook wrappers.

Use in conftest plugins

If a conftest plugin implements this hook, it will be called immediately when the conftest is registered.

This hook is only called for *initial conftests*.

pytest_addhooks (pluginmanager)

Called at plugin registration time to allow adding new hooks via a call to pluginmanager. add_hookspecs(module_or_class, prefix).

Parameters

pluginmanager (PytestPluginManager) - The pytest plugin manager.



1 Note

This hook is incompatible with hook wrappers.

If a conftest plugin implements this hook, it will be called immediately when the conftest is registered.

pytest_configure (config)

Allow plugins and conftest files to perform initial configuration.



This hook is incompatible with hook wrappers.

Parameters

config (Config) - The pytest config object.

Use in conftest plugins

This hook is called for every *initial conftest* file after command line options have been parsed. After that, the hook is called for other conftest files as they are registered.

pytest_unconfigure (config)

Called before test process is exited.

Parameters

config (Config) - The pytest config object.

Use in conftest plugins

Any conftest file can implement this hook.

pytest_sessionstart (session)

Called after the Session object has been created and before performing collection and entering the run test loop.

Parameters

session (Session) - The pytest session object.

Use in conftest plugins

This hook is only called for initial conftests.

pytest_sessionfinish(session, exitstatus)

Called after whole test run finished, right before returning the exit status to the system.

Parameters

- session (Session) The pytest session object.
- exitstatus (int / ExitCode) The status which pytest will return to the system.

Any conftest file can implement this hook.

pytest_plugin_registered (plugin, plugin_name, manager)

A new pytest plugin got registered.

Parameters

- plugin (_PluggyPlugin) The plugin module or instance.
- plugin_name (str) The name by which the plugin is registered.
- manager (PytestPluginManager) The pytest plugin manager.



This hook is incompatible with hook wrappers.

Use in conftest plugins

If a conftest plugin implements this hook, it will be called immediately when the conftest is registered, once for each plugin registered thus far (including itself!), and for all plugins thereafter when they are registered.

Collection hooks

pytest calls the following hooks for collecting files and directories:

pytest_collection (session)

Perform the collection phase for the given session.

Stops at first non-None result, see *firstresult: stop at first non-None result*. The return value is not used, but only stops further processing.

The default collection phase is this (see individual hooks for full details):

- 1. Starting from session as the initial collector:
 - 1. pytest_collectstart(collector)
 - 2. report = pytest_make_collect_report(collector)
 - 3. pytest_exception_interact(collector, call, report) if an interactive exception occurred
 - 4. For each collected node:
 - 1. If an item, pytest_itemcollected(item)
 - 2. If a collector, recurse into it.
 - 5. pytest_collectreport(report)
- pytest_collection_modifyitems(session, config, items)
- 1. pytest_deselected (items) for any deselected items (may be called multiple times)

- 3. pytest_collection_finish(session)
- 4. Set session.items to the list of collected items
- 5. Set session.testscollected to the number of collected items

You can implement this hook to only perform some action before collection, for example the terminal plugin uses it to start displaying the collection counter (and returns None).

Parameters

session (Session) - The pytest session object.

Use in conftest plugins

This hook is only called for *initial conftests*.

pytest_ignore_collect (collection_path, path, config)

Return True to ignore this path for collection.

Return None to let other plugins ignore the path for collection.

Returning False will forcefully *not* ignore this path for collection, without giving a chance for other plugins to ignore this path.

This hook is consulted for all files and directories prior to calling more specific hooks.

Stops at first non-None result, see firstresult: stop at first non-None result.

Parameters

- collection_path (pathlib.Path) The path to analyze.
- path (LEGACY_PATH) The path to analyze (deprecated).
- config (Config) The pytest config object.

Changed in version 7.0.0: The collection_path parameter was added as a pathlib.Path equivalent of the path parameter. The path parameter has been deprecated.

Use in conftest plugins

Any conftest file can implement this hook. For a given collection path, only conftest files in parent directories of the collection path are consulted (if the path is a directory, its own conftest file is *not* consulted - a directory cannot ignore itself!).

pytest_collect_directory (path, parent)

Create a Collector for the given directory, or None if not relevant.

Added in version 8.0.

For best results, the returned collector should be a subclass of Directory, but this is not required.

The new node needs to have the specified parent as a parent.

Stops at first non-None result, see firstresult: stop at first non-None result.

Parameters

```
path (pathlib.Path) - The path to analyze.
```

See *Using a custom directory collector* for a simple example of use of this hook.

Any conftest file can implement this hook. For a given collection path, only conftest files in parent directories of the collection path are consulted (if the path is a directory, its own conftest file is *not* consulted - a directory cannot collect itself!).

pytest_collect_file (file_path, path, parent)

Create a Collector for the given path, or None if not relevant.

For best results, the returned collector should be a subclass of File, but this is not required.

The new node needs to have the specified parent as a parent.

Parameters

- file_path (pathlib.Path) The path to analyze.
- path (LEGACY_PATH) The path to collect (deprecated).

Changed in version 7.0.0: The file_path parameter was added as a pathlib.Path equivalent of the path parameter. The path parameter has been deprecated.

Use in conftest plugins

Any conftest file can implement this hook. For a given file path, only conftest files in parent directories of the file path are consulted.

pytest_pycollect_makemodule (module_path, path, parent)

Return a pytest. Module collector or None for the given path.

This hook will be called for each matching test module path. The pytest_collect_file hook needs to be used if you want to create test modules for files that do not match as a test module.

Stops at first non-None result, see *firstresult: stop at first non-None result*.

Parameters

- module_path (pathlib.Path) The path of the module to collect.
- path (LEGACY_PATH) The path of the module to collect (deprecated).

Changed in version 7.0.0: The module_path parameter was added as a pathlib.Path equivalent of the path parameter.

The path parameter has been deprecated in favor of fspath.

Use in conftest plugins

Any conftest file can implement this hook. For a given parent collector, only conftest files in the collector's directory and its parent directories are consulted.

For influencing the collection of objects in Python modules you can use the following hook:

pytest_pycollect_makeitem (collector, name, obj)

Return a custom item/collector for a Python object in a module, or None.

Stops at first non-None result, see firstresult: stop at first non-None result.

Parameters

• collector (Module / Class) - The module/class collector.

- name (str) The name of the object in the module/class.
- **obj** (object) The object.

Returns

The created items/collectors.

Return type

None | *Item* | *Collector* | list[*Item* | *Collector*]

Use in conftest plugins

Any conftest file can implement this hook. For a given collector, only conftest files in the collector's directory and its parent directories are consulted.

pytest_generate_tests (metafunc)

Generate (multiple) parametrized calls to a test function.

Parameters

metafunc (Metafunc) - The Metafunc helper for the test function.

Use in conftest plugins

Any conftest file can implement this hook. For a given function definition, only conftest files in the functions's directory and its parent directories are consulted.

pytest_make_parametrize_id (config, val, argname)

Return a user-friendly string representation of the given val that will be used by @pytest.mark.parametrize calls, or None if the hook doesn't know about val.

The parameter name is available as argname, if required.

Stops at first non-None result, see firstresult: stop at first non-None result.

Parameters

- config (Config) The pytest config object.
- **val** (object) The parametrized value.
- **argname** (str) The automatic parameter name produced by pytest.

Use in conftest plugins

Any conftest file can implement this hook.

Hooks for influencing test skipping:

pytest markeval namespace(config)

Called when constructing the globals dictionary used for evaluating string conditions in xfail/skipif markers.

This is useful when the condition for a marker requires objects that are expensive or impossible to obtain during collection time, which is required by normal boolean conditions.

Added in version 6.2.

Parameters

config (Config) - The pytest config object.

Returns

A dictionary of additional globals to add.

Return type

dict[str, Any]

Use in conftest plugins

Any conftest file can implement this hook. For a given item, only conftest files in parent directories of the item are consulted.

After collection is complete, you can modify the order of items, delete or otherwise amend the test items:

pytest_collection_modifyitems (session, config, items)

Called after collection has been performed. May filter or re-order the items in-place.

When items are deselected (filtered out from items), the hook pytest_deselected must be called explicitly with the deselected items to properly notify other plugins, e.g. with config.hook. pytest_deselected(deselected_items).

Parameters

- session (Session) The pytest session object.
- config (Config) The pytest config object.
- items (list[Item]) List of item objects.

Use in conftest plugins

Any conftest plugin can implement this hook.



1 Note

If this hook is implemented in conftest.py files, it always receives all collected items, not only those under the conftest.py where it is implemented.

pytest_collection_finish(session)

Called after collection has been performed and modified.

Parameters

session (Session) - The pytest session object.

Use in conftest plugins

Any conftest plugin can implement this hook.

Test running (runtest) hooks

All runtest related hooks receive a pytest. Item object.

pytest_runtestloop (session)

Perform the main runtest loop (after collection finished).

The default hook implementation performs the runtest protocol for all items collected in the session (session. items), unless the collection failed or the collectionly pytest option is set.

If at any point pytest.exit() is called, the loop is terminated immediately.

If at any point session. should fail or session. should stop are set, the loop is terminated after the runtest protocol for the current item is finished.

Parameters

```
session (Session) - The pytest session object.
```

Stops at first non-None result, see *firstresult: stop at first non-None result*. The return value is not used, but only stops further processing.

Use in conftest plugins

Any conftest file can implement this hook.

pytest_runtest_protocol (item, nextitem)

Perform the runtest protocol for a single test item.

The default runtest protocol is this (see individual hooks for full details):

- pytest_runtest_logstart(nodeid, location)
- Setup phase:

```
- call = pytest_runtest_setup(item) (wrapped in CallInfo(when="setup"))
- report = pytest_runtest_makereport(item, call)
```

- pytest runtest logreport(report)
- pytest_exception_interact(call, report) if an interactive exception occurred
- Call phase, if the setup passed and the setuponly pytest option is not set:

```
- call = pytest_runtest_call(item) (wrapped in CallInfo(when="call"))
```

- report = pytest runtest makereport(item, call)
- pytest_runtest_logreport(report)
- pytest_exception_interact(call, report) if an interactive exception occurred

• Teardown phase:

```
- call = pytest_runtest_teardown(item, nextitem) (wrapped in Call-
Info(when="teardown"))
```

- report = pytest_runtest_makereport(item, call)
- pytest_runtest_logreport(report)
- pytest exception interact (call, report) if an interactive exception occurred

• pytest_runtest_logfinish(nodeid, location)

Parameters

- item (Item) Test item for which the runtest protocol is performed.
- **nextitem** (Item / None) The scheduled-to-be-next test item (or None if this is the end my friend).

Stops at first non-None result, see *firstresult: stop at first non-None result*. The return value is not used, but only stops further processing.

Use in conftest plugins

Any conftest file can implement this hook.

pytest_runtest_logstart (nodeid, location)

Called at the start of running the runtest protocol for a single item.

See pytest_runtest_protocol for a description of the runtest protocol.

Parameters

- **nodeid** (str) Full node ID of the item.
- location (tuple[str, int | None, str]) A tuple of (filename, lineno, testname) where filename is a file path relative to config.rootpath and lineno is 0-based.

Use in conftest plugins

Any conftest file can implement this hook. For a given item, only conftest files in the item's directory and its parent directories are consulted.

pytest_runtest_logfinish (nodeid, location)

Called at the end of running the runtest protocol for a single item.

See pytest_runtest_protocol for a description of the runtest protocol.

Parameters

- nodeid (str) Full node ID of the item.
- location (tuple[str, int | None, str]) A tuple of (filename, lineno, testname) where filename is a file path relative to config.rootpath and lineno is 0-based.

Use in conftest plugins

Any conftest file can implement this hook. For a given item, only conftest files in the item's directory and its parent directories are consulted.

pytest_runtest_setup(item)

Called to perform the setup phase for a test item.

The default implementation runs setup () on item and all of its parents (which haven't been setup yet). This includes obtaining the values of fixtures required by the item (which haven't been obtained yet).

Parameters

item (Item) - The item.

Any conftest file can implement this hook. For a given item, only conftest files in the item's directory and its parent directories are consulted.

pytest_runtest_call (item)

Called to run the test for test item (the call phase).

The default implementation calls item.runtest().

Parameters

item (Item) - The item.

Use in conftest plugins

Any conftest file can implement this hook. For a given item, only conftest files in the item's directory and its parent directories are consulted.

pytest_runtest_teardown (item, nextitem)

Called to perform the teardown phase for a test item.

The default implementation runs the finalizers and calls teardown () on item and all of its parents (which need to be torn down). This includes running the teardown phase of fixtures required by the item (if they go out of scope).

Parameters

- item (Item) The item.
- **nextitem** (Item / None) The scheduled-to-be-next test item (None if no further test item is scheduled). This argument is used to perform exact teardowns, i.e. calling just enough finalizers so that nextitem only needs to call setup functions.

Use in conftest plugins

Any conftest file can implement this hook. For a given item, only conftest files in the item's directory and its parent directories are consulted.

pytest runtest makereport (item, call)

Called to create a TestReport for each of the setup, call and teardown runtest phases of a test item.

See pytest_runtest_protocol for a description of the runtest protocol.

Parameters

- item (Item) The item.
- call (CallInfo[None]) The CallInfo for the phase.

Stops at first non-None result, see *firstresult: stop at first non-None result*.

Any conftest file can implement this hook. For a given item, only conftest files in the item's directory and its parent directories are consulted.

For deeper understanding you may look at the default implementation of these hooks in _pytest.runner and maybe also in _pytest.pdb which interacts with _pytest.capture and its input/output capturing in order to immediately drop into interactive debugging when a test failure occurs.

```
pytest_pyfunc_call (pyfuncitem)
```

Call underlying test function.

Stops at first non-None result, see firstresult: stop at first non-None result.

Parameter

pyfuncitem (Function) - The function item.

Use in conftest plugins

Any conftest file can implement this hook. For a given item, only conftest files in the item's directory and its parent directories are consulted.

Reporting hooks

Session related reporting hooks:

```
pytest_collectstart (collector)
```

Collector starts collecting.

Parameters

collector (Collector) - The collector.

Use in conftest plugins

Any conftest file can implement this hook. For a given collector, only conftest files in the collector's directory and its parent directories are consulted.

```
pytest_make_collect_report (collector)
```

```
Perform collector.collect() and return a CollectReport.
```

Stops at first non-None result, see *firstresult: stop at first non-None result*.

Parameters

collector (Collector) - The collector.

Any conftest file can implement this hook. For a given collector, only conftest files in the collector's directory and its parent directories are consulted.

pytest_itemcollected(item)

We just collected a test item.

Parameters

item (Item) - The item.

Use in conftest plugins

Any conftest file can implement this hook. For a given item, only conftest files in the item's directory and its parent directories are consulted.

pytest_collectreport (report)

Collector finished collecting.

Parameters

report (CollectReport) - The collect report.

Use in conftest plugins

Any conftest file can implement this hook. For a given collector, only conftest files in the collector's directory and its parent directories are consulted.

pytest_deselected (items)

Called for deselected test items, e.g. by keyword.

Note that this hook has two integration aspects for plugins:

- it can be *implemented* to be notified of deselected items
- it must be *called* from <code>pytest_collection_modifyitems</code> implementations when items are deselected (to properly notify other plugins).

May be called multiple times.

Parameters

```
items (Sequence [Item]) - The items.
```

Use in conftest plugins

Any conftest file can implement this hook.

```
pytest_report_header (config, start_path, startdir)
```

Return a string or list of strings to be displayed as header info for terminal reporting.

Parameters

- config (Config) The pytest config object.
- start_path (pathlib.Path) The starting dir.
- **startdir** (*LEGACY_PATH*) The starting dir (deprecated).

1 Note

Lines returned by a plugin are displayed before those of plugins which ran before it. If you want to have your line(s) displayed first, use *trylast=True*.

Changed in version 7.0.0: The start_path parameter was added as a pathlib.Path equivalent of the startdir parameter. The startdir parameter has been deprecated.

Use in conftest plugins

This hook is only called for *initial conftests*.

pytest_report_collectionfinish(config, start_path, startdir, items)

Return a string or list of strings to be displayed after collection has finished successfully.

These strings will be displayed after the standard "collected X items" message.

Added in version 3.2.

Parameters

- **config** (Config) The pytest config object.
- start_path (pathlib.Path) The starting dir.
- **startdir** (*LEGACY_PATH*) The starting dir (deprecated).
- items (Sequence[Item]) List of pytest items that are going to be executed; this list should not be modified.

1 Note

Lines returned by a plugin are displayed before those of plugins which ran before it. If you want to have your line(s) displayed first, use *trylast=True*.

Changed in version 7.0.0: The start_path parameter was added as a pathlib.Path equivalent of the startdir parameter. The startdir parameter has been deprecated.

Use in conftest plugins

Any conftest plugin can implement this hook.

pytest_report_teststatus (report, config)

Return result-category, shortletter and verbose word for status reporting.

The result-category is a category in which to count the result, for example "passed", "skipped", "error" or the empty string.

The shortletter is shown as testing progresses, for example ".", "s", "E" or the empty string.

The verbose word is shown as testing progresses in verbose mode, for example "PASSED", "SKIPPED", "ERROR" or the empty string.

pytest may style these implicitly according to the report outcome. To provide explicit styling, return a tuple for the verbose word, for example "rerun", "R", ("RERUN", {"yellow": True}).

Parameters

- report (CollectReport / TestReport) The report object whose status is to be returned.
- config (Config) The pytest config object.

Returns

The test status.

Return type

```
TestShortLogReport | tuple[str, str, str | tuple[str, Mapping[str, bool]]]
```

Stops at first non-None result, see firstresult: stop at first non-None result.

Use in conftest plugins

Any conftest plugin can implement this hook.

```
pytest_report_to_serializable (config, report)
```

Serialize the given report object into a data structure suitable for sending over the wire, e.g. converted to JSON.

Parameters

- config (Config) The pytest config object.
- report (CollectReport / TestReport) The report.

Use in conftest plugins

Any conftest file can implement this hook. The exact details may depend on the plugin which calls the hook.

```
pytest_report_from_serializable (config, data)
```

Restore a report object previously serialized with pytest_report_to_serializable.

Parameters

config (Config) - The pytest config object.

Use in conftest plugins

Any conftest file can implement this hook. The exact details may depend on the plugin which calls the hook.

```
pytest_terminal_summary (terminalreporter, exitstatus, config)
```

Add a section to terminal summary reporting.

Parameters

- terminalreporter (TerminalReporter) The internal terminal reporter object.
- exitstatus (ExitCode) The exit status that will be reported back to the OS.
- config (Config) The pytest config object.

Added in version 4.2: The config parameter.

Any conftest plugin can implement this hook.

pytest_fixture_setup (fixturedef, request)

Perform fixture setup execution.

Parameters

- fixturedef (FixtureDef [Any]) The fixture definition object.
- request (SubRequest) The fixture request object.

Returns

The return value of the call to the fixture function.

Return type

object | None

Stops at first non-None result, see *firstresult: stop at first non-None result*.



1 Note

If the fixture function returns None, other implementations of this hook function will continue to be called, according to the behavior of the firstresult: stop at first non-None result option.

Use in conftest plugins

Any conftest file can implement this hook. For a given fixture, only conftest files in the fixture scope's directory and its parent directories are consulted.

pytest_fixture_post_finalizer (fixturedef, request)

Called after fixture teardown, but before the cache is cleared, so the fixture result fixturedef. cached_result is still available (not None).

Parameters

- **fixturedef** (FixtureDef [Any]) The fixture definition object.
- request (SubRequest) The fixture request object.

Use in conftest plugins

Any conftest file can implement this hook. For a given fixture, only conftest files in the fixture scope's directory and its parent directories are consulted.

pytest_warning_recorded (warning_message, when, nodeid, location)

Process a warning captured by the internal pytest warnings plugin.

Parameters

- warning message (warnings. WarningMessage) The captured warning. This is the same object produced by warnings.catch warnings, and contains the same attributes as the parameters of warnings.showwarning().
- 'collect', 'runtest']) Indicates when the • when (Literal['config', warning was captured. Possible values:

- "config": during pytest configuration/initialization stage.
- "collect": during test collection.
- "runtest": during test execution.
- **nodeid** (str) Full id of the item. Empty string for warnings that are not specific to a particular node.
- **location** (tuple[str, int, str] / None) When available, holds information about the execution context of the captured warning (filename, linenumber, function). function evaluates to <module> when the execution context is at the module level.

Added in version 6.0.

Use in conftest plugins

Any conftest file can implement this hook. If the warning is specific to a particular node, only conftest files in parent directories of the node are consulted.

Central hook for reporting about test execution:

pytest_runtest_logreport (report)

Process the TestReport produced for each of the setup, call and teardown runtest phases of an item.

See pytest_runtest_protocol for a description of the runtest protocol.

Use in conftest plugins

Any conftest file can implement this hook. For a given item, only conftest files in the item's directory and its parent directories are consulted.

Assertion related hooks:

```
pytest_assertrepr_compare (config, op, left, right)
```

Return explanation for comparisons in failing assert expressions.

Return None for no custom explanation, otherwise return a list of strings. The strings will be joined by newlines but any newlines *in* a string will be escaped. Note that all but the first line will be indented slightly, the intention is for the first line to be a summary.

Parameters

- config (Config) The pytest config object.
- op (str) The operator, e.g. "==", "!=", "not in".
- **left** (object) The left operand.
- right (object) The right operand.

Any conftest file can implement this hook. For a given item, only conftest files in the item's directory and its parent directories are consulted.

```
pytest_assertion_pass(item, lineno, orig, expl)
```

Called whenever an assertion passes.

Added in version 5.0.

Use this hook to do some processing after a passing assertion. The original assertion information is available in the original assertion information is available in the expl string.

This hook must be explicitly enabled by the enable_assertion_pass_hook ini-file option:

```
[pytest]
enable_assertion_pass_hook=true
```

You need to **clean the .pyc** files in your project directory and interpreter libraries when enabling this option, as assertions will require to be re-written.

Parameters

- item (Item) pytest item object of current test.
- **lineno** (*int*) Line number of the assert statement.
- **orig** (*str*) String with the original assertion.
- **expl** (str) String with the assert explanation.

Use in conftest plugins

Any conftest file can implement this hook. For a given item, only conftest files in the item's directory and its parent directories are consulted.

Debugging/Interaction hooks

There are few hooks which can be used for special reporting or interaction with exceptions:

```
pytest_internalerror(excrepr, excinfo)
```

Called for internal errors.

Return True to suppress the fallback handling of printing an INTERNALERROR message directly to sys.stderr.

Parameters

- excrepr (ExceptionRepr) The exception repr object.
- excinfo (ExceptionInfo [BaseException]) The exception info.

Any conftest plugin can implement this hook.

pytest_keyboard_interrupt(excinfo)

Called for keyboard interrupt.

Parameters

excinfo (ExceptionInfo [KeyboardInterrupt | Exit]) - The exception info.

Use in conftest plugins

Any conftest plugin can implement this hook.

pytest_exception_interact (node, call, report)

Called when an exception was raised which can potentially be interactively handled.

May be called during collection (see pytest_make_collect_report), in which case report is a CollectReport.

May be called during runtest of an item (see pytest_runtest_protocol), in which case report is a
TestReport.

This hook is not called if the exception that was raised is an internal exception like skip. Exception.

Parameters

- node (Item / Collector) The item or collector.
- **call** (CallInfo[Any]) The call information. Contains the exception.
- report (CollectReport / TestReport) The collection or test report.

Use in conftest plugins

Any conftest file can implement this hook. For a given node, only conftest files in parent directories of the node are consulted.

pytest_enter_pdb (config, pdb)

Called upon pdb.set_trace().

Can be used by plugins to take special action just before the python debugger enters interactive mode.

Parameters

- config (Config) The pytest config object.
- pdb (pdb.Pdb) The Pdb instance.

Any conftest plugin can implement this hook.

pytest_leave_pdb (config, pdb)

Called when leaving pdb (e.g. with continue after pdb.set_trace()).

Can be used by plugins to take special action just after the python debugger leaves interactive mode.

Parameters

- config (Config) The pytest config object.
- pdb (pdb.Pdb) The Pdb instance.

Use in conftest plugins

Any conftest plugin can implement this hook.

3.4.6 Collection tree objects

These are the collector and item classes (collectively called "nodes") which make up the collection tree.

Node

class Node

Bases: ABC

Base class of Collector and Item, the components of the test collection tree.

Collector's are the internal nodes of the tree, and Item's are the leaf nodes.

fspath: LEGACY PATH

A LEGACY_PATH copy of the path attribute. Intended for usage for methods not migrated to pathlib. Path yet, such as Item.reportinfo. Will be deprecated in a future release, prefer using path instead.

name: str

A unique name within the scope of the parent node.

parent

The parent collector node.

config: Config

The pytest config object.

session: Session

The pytest session this node is part of.

path: pathlib.Path

Filesystem path where this node was collected from (can be None).

keywords: MutableMapping[str, Any]

Keywords/markers collected from all scopes.

```
own_markers: list[Mark]
```

The marker objects belonging to this node.

extra_keyword_matches: set[str]

Allow adding of extra keywords to use for matching.

stash: Stash

A place where plugins can store information on the node for their own use.

```
classmethod from_parent (parent, **kw)
```

Public constructor for Nodes.

This indirection got introduced in order to enable removing the fragile logic from the node constructors.

Subclasses can use super().from_parent(...) when overriding the construction.

Parameters

parent (Node) - The parent node of this Node.

property ihook: HookRelay

fspath-sensitive hook proxy used to call pytest hooks.

warn (warning)

Issue a warning for this Node.

Warnings will be displayed after the test session, unless explicitly suppressed.

Parameters

```
warning (Warning) - The warning instance to issue.
```

Raises

ValueError - If warning instance is not a subclass of Warning.

Example usage:

```
node.warn(PytestWarning("some message"))
node.warn(UserWarning("some message"))
```

Changed in version 6.2: Any subclass of Warning is now accepted, rather than only PytestWarning subclasses.

property nodeid: str

A ::-separated string denoting its collection tree address.

```
for ... in iter_parents()
```

Iterate over all parent collectors starting from and including self up to the root of the collection tree.

Added in version 8.1.

listchain()

Return a list of all parent collectors starting from the root of the collection tree down to and including self.

```
add_marker (marker, append=True)
```

Dynamically add a marker object to the node.

Parameters

```
• marker (str / MarkDecorator) - The marker.
```

• **append** (bool) – Whether to append the marker, or prepend it.

iter markers (name=None)

Iterate over all markers of the node.

Parameters

```
name (str / None) - If given, filter the results by the name attribute.
```

Returns

An iterator of the markers of the node.

Return type

Iterator [Mark]

for ... in iter_markers_with_node(name=None)

Iterate over all markers of the node.

Parameters

```
name (str / None) - If given, filter the results by the name attribute.
```

Returns

An iterator of (node, mark) tuples.

Return type

Iterator[tuple[Node, Mark]]

```
\label{eq:get_closest_marker} \textit{(name: str)} \rightarrow \textit{Mark} \mid \text{None} \\ \text{get_closest_marker} \textit{(name: str, default: Mark)} \rightarrow \textit{Mark} \\
```

Return the first marker matching the name, from closest (for example function) to farther level (for example module level).

Parameters

- default Fallback return value if no marker was found.
- name Name to filter by.

listextrakeywords()

Return a set of all extra keywords in self and any parents.

addfinalizer(fin)

Register a function to be called without arguments when this node is finalized.

This method can only be called when this node is active in a setup chain, for example during self.setup().

getparent (cls)

Get the closest parent node (including self) which is an instance of the given class.

Parameters

```
cls (type[\_NodeType]) - The node class to search for.
```

Returns

The node, if found.

Return type

_NodeType | None

repr_failure (excinfo, style=None)

Return a representation of a collection or test failure.

```
→ See also
```

Working with non-python tests

Parameters

excinfo (ExceptionInfo[BaseException]) - Exception information for the failure.

Collector

class Collector

Bases: Node, ABC

Base class of all collectors.

Collector create children through collect () and thus iteratively build the collection tree.

exception CollectError

```
Bases: Exception
```

An error during collection, contains a custom message.

abstractmethod collect()

Collect children (items and collectors) for this collector.

repr_failure (excinfo)

Return a representation of a collection failure.

Parameters

excinfo (ExceptionInfo[BaseException]) - Exception information for the failure.

name: str

A unique name within the scope of the parent node.

parent

The parent collector node.

config: Config

The pytest config object.

session: Session

The pytest session this node is part of.

path: pathlib.Path

Filesystem path where this node was collected from (can be None).

Item

class Item

Bases: Node, ABC

Base class of all test invocation items.

Note that for a single function there might be multiple test invocation items.

```
user_properties: list[tuple[str, object]]
```

A list of tuples (name, value) that holds user defined properties for this test.

name: str

A unique name within the scope of the parent node.

parent

The parent collector node.

config: Config

The pytest config object.

session: Session

The pytest session this node is part of.

path: pathlib.Path

Filesystem path where this node was collected from (can be None).

abstractmethod runtest()

Run the test case for this item.

Must be implemented by subclasses.

```
→ See also
```

Working with non-python tests

add_report_section (when, key, content)

Add a new report section, similar to what's done internally to add stdout and stderr captured output:

```
item.add_report_section("call", "stdout", "report section contents")
```

Parameters

- when (str) One of the possible capture states, "setup", "call", "teardown".
- **key** (*str*) Name of the section, can be customized at will. Pytest uses "stdout" and "stderr" internally.
- content (str) The full contents as a string.

reportinfo()

Get location information for this item for test reports.

Returns a tuple with three elements:

- The path of the test (default self.path)
- The 0-based line number of the test (default None)
- A name of the test to be shown (default "")

→ See also

Working with non-python tests

property location: tuple[str, int | None, str]

Returns a tuple of (relfspath, lineno, testname) for this item where relfspath is file path relative to config.rootpath and lineno is a 0-based line number.

File

class File

Bases: FSCollector, ABC

Base class for collecting tests from a file.

Working with non-python tests.

name: str

A unique name within the scope of the parent node.

parent

The parent collector node.

config: Config

The pytest config object.

session: Session

The pytest session this node is part of.

path: pathlib.Path

Filesystem path where this node was collected from (can be None).

FSCollector

class FSCollector

Bases: Collector, ABC

Base class for filesystem collectors.

path: pathlib.Path

Filesystem path where this node was collected from (can be None).

classmethod from_parent (parent, *, fspath=None, path=None, **kw)

The public constructor.

name: str

A unique name within the scope of the parent node.

parent

The parent collector node.

config: Config

The pytest config object.

session: Session

The pytest session this node is part of.

Session

final class Session

Bases: Collector

The root of the collection tree.

Session collects the initial paths given as arguments to pytest.

exception Interrupted

Bases: KeyboardInterrupt

Signals that the test run was interrupted.

exception Failed

Bases: Exception

Signals a stop as failed test run.

property startpath: Path

The path from which pytest was invoked.

Added in version 7.0.0.

isinitpath (path, *, with_parents=False)

Is path an initial path?

An initial path is a path explicitly given to pytest on the command line.

Parameters

with_parents (bool) - If set, also return True if the path is a parent of an initial path.

Changed in version 8.0: Added the with_parents parameter.

```
perform_collect (args: Sequence[str] | None = None, genitems: Literal[True] = True) \rightarrow Sequence[Item] perform_collect (args: Sequence[str] | None = None, genitems: bool = True) \rightarrow Sequence[Item | Collector] Perform the collection phase for this session.
```

This is called by the default <code>pytest_collection</code> hook implementation; see the documentation of this hook for more details. For testing purposes, it may also be called directly on a fresh <code>Session</code>.

This function normally recursively expands any collectors collected from the session to their items, and only items are returned. For testing purposes, this may be suppressed by passing genitems=False, in which case the return value contains these collectors unexpanded, and session.items is empty.

```
for ... in collect()
```

Collect children (items and collectors) for this collector.

name: str

A unique name within the scope of the parent node.

parent

The parent collector node.

config: Config

The pytest config object.

session: Session

The pytest session this node is part of.

path: pathlib.Path

Filesystem path where this node was collected from (can be None).

Package

class Package

Bases: Directory

Collector for files and directories in a Python packages – directories with an ___init___.py file.



Directories without an __init__.py file are instead collected by Dir by default. Both are Directory collectors.

Changed in version 8.0: Now inherits from Directory.

```
for ... in collect()
```

Collect children (items and collectors) for this collector.

```
name: str
          A unique name within the scope of the parent node.
     parent
          The parent collector node.
     config: Config
          The pytest config object.
     session: Session
          The pytest session this node is part of.
     path: pathlib.Path
          Filesystem path where this node was collected from (can be None).
Module
class Module
     Bases: File, PyCollector
     Collector for test classes and functions in a Python module.
     collect()
          Collect children (items and collectors) for this collector.
     name: str
          A unique name within the scope of the parent node.
          The parent collector node.
     config: Config
          The pytest config object.
     session: Session
          The pytest session this node is part of.
     path: pathlib.Path
          Filesystem path where this node was collected from (can be None).
Class
class Class
     Bases: PyCollector
     Collector for test methods (and nested classes) in a Python class.
     classmethod from_parent (parent, *, name, obj=None, **kw)
          The public constructor.
```

collect()

Collect children (items and collectors) for this collector.

name: str

A unique name within the scope of the parent node.

parent

The parent collector node.

config: Config

The pytest config object.

session: Session

The pytest session this node is part of.

path: pathlib.Path

Filesystem path where this node was collected from (can be None).

Function

class Function

Bases: PyobjMixin, Item

Item responsible for setting up and executing a Python test function.

Parameters

- name The full function name, including any decorations like those added by parametrization (my_func[my_param]).
- parent The parent Node.
- config The pytest Config object.
- **callspec** If given, this function has been parametrized and the callspec contains meta information about the parametrization.
- callobj If given, the object which will be called when the Function is invoked, otherwise the callobj will be obtained from parent using originalname.
- **keywords** Keywords bound to the function object for "-k" matching.
- session The pytest Session object.
- **fixtureinfo** Fixture information already resolved at this fixture node..
- **originalname** The attribute name to use for accessing the underlying function object. Defaults to name. Set this if name is different from the original name, for example when it contains decorations like those added by parametrization (my_func[my_param]).

originalname

Original function name, without any decorations (for example parametrization adds a "[...]" suffix to function names), used to access the underlying function object from parent (in case callobj is not given explicitly).

Added in version 3.0.

classmethod from_parent(parent, **kw)

The public constructor.

property function

Underlying python 'function' object.

property instance

Python instance object the function is bound to.

Returns None if not a test method, e.g. for a standalone test function, a class or a module.

runtest()

Execute the underlying test function.

repr_failure (excinfo)

Return a representation of a collection or test failure.

See also

Working with non-python tests

Parameters

excinfo (ExceptionInfo[BaseException]) - Exception information for the failure.

name: str

A unique name within the scope of the parent node.

parent

The parent collector node.

config: Config

The pytest config object.

session: Session

The pytest session this node is part of.

path: pathlib.Path

Filesystem path where this node was collected from (can be None).

FunctionDefinition

class FunctionDefinition

Bases: Function

This class is a stop gap solution until we evolve to have actual function definition nodes and manage to get rid of metafunc.

```
runtest()
    Execute the underlying test function.

name: str
    A unique name within the scope of the parent node.

parent
    The parent collector node.

config: Config
    The pytest config object.

session: Session
    The pytest session this node is part of.

path: pathlib.Path
    Filesystem path where this node was collected from (can be None).
setup()
```

3.4.7 Objects

Objects accessible from fixtures or hooks or importable from pytest.

CallInfo

final class CallInfo

Result/Exception info of a function invocation.

Execute the underlying test function.

```
excinfo: ExceptionInfo[BaseException] | None
    The captured exception of the call, if it raised.

start: float
    The system time when the call started, in seconds since the epoch.

stop: float
    The system time when the call ended, in seconds since the epoch.

duration: float
    The call duration, in seconds.

when: Literal['collect', 'setup', 'call', 'teardown']
    The context of invocation: "collect", "setup", "call" or "teardown".

property result: TResult
    The return value of the call, if it didn't raise.
    Can only be accessed if excinfo is None.
```

```
classmethod from_call (func, when, reraise=None)
```

Call func, wrapping the result in a CallInfo.

Parameters

- **func** (Callable[[], _pytest.runner.TResult]) The function to call. Called without arguments.
- when (Literal['collect', 'setup', 'call', 'teardown']) The phase in which the function is called.
- reraise (type[BaseException] | tuple[type[BaseException], ...] | None) Exception or exceptions that shall propagate if raised by the function, instead of being wrapped in the CallInfo.

CollectReport

final class CollectReport

Bases: BaseReport

Collection report object.

Reports can contain arbitrary extra attributes.

nodeid: str

Normalized collection nodeid.

```
outcome: Literal['passed', 'failed', 'skipped']
```

Test outcome, always one of "passed", "failed", "skipped".

```
longrepr: None | ExceptionInfo[BaseException] | tuple[str, int, str] | str
| TerminalRepr
```

None or a failure representation.

result

The collected items and collection nodes.

```
sections: list[tuple[str, str]]
```

Tuples of str (heading, content) with extra information for the test report. Used by pytest to add text captured from stdout, stderr, and intercepted logging events. May be used by other plugins to add arbitrary information to reports.

property caplog: str

Return captured log lines, if log capturing is enabled.

Added in version 3.5.

property capstderr: str

Return captured text from stderr, if capturing is enabled.

Added in version 3.0.

property capstdout: str

Return captured text from stdout, if capturing is enabled.

Added in version 3.0.

property count_towards_summary: bool

Experimental Whether this report should be counted towards the totals shown at the end of the test session: "1 passed, 1 failure, etc".



This function is considered **experimental**, so beware that it is subject to changes even in patch releases.

property failed: bool

Whether the outcome is failed.

property fspath: str

The path portion of the reported node, as a string.

property head_line: str | None

Experimental The head line shown with longrepr output for this report, more commonly during traceback representation during failures:

```
_____ Test.foo _____
```

In the example above, the head line is "Test.foo".

1 Note

This function is considered **experimental**, so beware that it is subject to changes even in patch releases.

property longreprtext: str

Read-only property that returns the full string representation of longrepr.

Added in version 3.0.

property passed: bool

Whether the outcome is passed.

property skipped: bool

Whether the outcome is skipped.

Config

final class Config

Access to configuration values, pluginmanager and plugin hooks.

Parameters

- pluginmanager (PytestPluginManager) A pytest PluginManager.
- invocation_params (InvocationParams) Object containing parameters regarding the pytest.main() invocation.

final class InvocationParams (*, args, plugins, dir)

Holds parameters passed during pytest.main().

The object attributes are read-only.

Added in version 5.1.

1 Note

Note that the environment variable PYTEST_ADDOPTS and the addopts ini option are handled by pytest, not being included in the args attribute.

Plugins accessing InvocationParams must be aware of that.

```
args: tuple[str, ...]
        The command-line arguments as passed to pytest.main().
    plugins: Sequence[str | object] | None
        Extra plugins, might be None.
    dir: Path
        The directory from which pytest.main() was invoked. :type: pathlib.Path
class ArgsSource (value, names=<not given>, *values, module=None, qualname=None, type=None,
                      start=1, boundary=None)
    Indicates the source of the test arguments.
    Added in version 7.2.
    ARGS = 1
        Command line arguments.
    INVOCATION_DIR = 2
        Invocation directory.
    TESTPATHS = 3
        'testpaths' configuration value.
option
    Access to command line option as attributes.
        Type
            argparse.Namespace
```

invocation_params

The parameters with which pytest was invoked.

Type

InvocationParams

pluginmanager

The plugin manager handles plugin registration and hook invocation.

Type

PytestPluginManager

stash

A place where plugins can store information on the config for their own use.

Type

Stash

property rootpath: Path

The path to the rootdir.

Type

pathlib.Path

Added in version 6.1.

property inipath: Path | None

The path to the configfile.

Added in version 6.1.

add_cleanup(func)

Add a function to be called when the config object gets out of use (usually coinciding with pytest_unconfigure).

classmethod fromdictargs(option_dict, args)

Constructor usable for subprocesses.

issue_config_time_warning(warning, stacklevel)

Issue and handle a warning during the "configure" stage.

During pytest_configure we can't capture warnings using the catch_warnings_for_item function because it is not possible to have hook wrappers around pytest_configure.

This function is mainly intended for plugins that need to issue warnings during pytest_configure (or similar stages).

Parameters

- warning (Warning) The warning instance.
- **stacklevel** (*int*) stacklevel forwarded to warnings.warn.

addinivalue_line (name, line)

Add a line to an ini-file option. The option must have been declared but might not yet be set in which case the line becomes the first line in its value.

getini(name)

Return configuration value from an ini file.

If a configuration value is not defined in an *ini file*, then the default value provided while registering the configuration through *parser.addini* will be returned. Please note that you can even provide None as a valid default value.

If default is not provided while registering using <code>parser.addini</code>, then a default value based on the type parameter passed to <code>parser.addini</code> will be returned. The default values based on type are: paths, pathlist, args and linelist: empty list [] bool: False string: empty string ""

If neither the default nor the type parameter is passed while registering the configuration through parser.addini, then the configuration is treated as a string and a default empty string "is returned.

If the specified name hasn't been registered through a prior parser.addini call (usually from a plugin), a ValueError is raised.

```
getoption (name, default=<NOTSET>, skip=False)
```

Return command line option value.

Parameters

- name (str) Name of the option. You may also specify the literal --OPT option instead of the "dest" option name.
- **default** Default value if no option of that name exists.
- **skip** $(b \circ o 1)$ If True, raise pytest.skip if option does not exists or has a None value.

```
getvalue (name, path=None)
```

Deprecated, use getoption() instead.

```
getvalueorskip (name, path=None)
```

Deprecated, use getoption(skip=True) instead.

```
VERBOSITY_ASSERTIONS: Final = 'assertions'
```

Verbosity type for failed assertions (see verbosity_assertions).

```
VERBOSITY_TEST_CASES: Final = 'test_cases'
```

Verbosity type for test case execution (see verbosity_test_cases).

```
get_verbosity (verbosity_type=None)
```

Retrieve the verbosity level for a fine-grained verbosity type.

Parameters

verbosity_type (str / None) – Verbosity type to get level for. If a level is configured for the given type, that value will be returned. If the given type is not a known verbosity type, the global verbosity level will be returned. If the given type is None (default), the global verbosity level will be returned.

To configure a level for a fine-grained verbosity type, the configuration file should have a setting for the configuration name and a numeric value for the verbosity level. A special value of "auto" can be used to explicitly use the global verbosity level.

Example:

```
# content of pytest.ini
[pytest]
verbosity_assertions = 2
```

```
pytest -v
```

```
print(config.get_verbosity()) # 1
print(config.get_verbosity(Config.VERBOSITY_ASSERTIONS)) # 2
```

Dir

final class Dir

Collector of files in a file system directory.

Added in version 8.0.



Python directories with an __init__.py file are instead collected by <code>Package</code> by default. Both are <code>Directory</code> collectors.

classmethod from_parent (parent, *, path)

The public constructor.

Parameters

- parent (nodes.Collector) The parent collector of this Dir.
- path (pathlib.Path) The directory's path.

```
for ... in collect()
```

Collect children (items and collectors) for this collector.

name: str

A unique name within the scope of the parent node.

parent

The parent collector node.

config: Config

The pytest config object.

session: Session

The pytest session this node is part of.

path: pathlib.Path

Filesystem path where this node was collected from (can be None).

Directory

class Directory

Base class for collecting files from a directory.

A basic directory collector does the following: goes over the files and sub-directories in the directory and creates collectors for them by calling the hooks <code>pytest_collect_directory</code> and <code>pytest_collect_file</code>, after checking that they are not ignored using <code>pytest_ignore_collect</code>.

The default directory collectors are Dir and Package.

Added in version 8.0.

Using a custom directory collector.

name: str

A unique name within the scope of the parent node.

parent

The parent collector node.

config: Config

The pytest config object.

session: Session

The pytest session this node is part of.

path: pathlib.Path

Filesystem path where this node was collected from (can be None).

ExceptionInfo

final class ExceptionInfo

Wraps sys.exc_info() objects and offers help for navigating the traceback.

classmethod from_exception(exception, exprinfo=None)

Return an ExceptionInfo for an existing exception.

The exception must have a non-None __traceback__ attribute, otherwise this function fails with an assertion error. This means that the exception must have been raised, or added a traceback with the with traceback() method.

Parameters

exprinfo (str / None) - A text string helping to determine if we should strip AssertionError from the output. Defaults to the exception message/__str__().

Added in version 7.4.

classmethod from_exc_info(exc_info, exprinfo=None)

Like from_exception(), but using old-style exc_info tuple.

classmethod from_current(exprinfo=None)

Return an ExceptionInfo matching the current traceback.

🛕 Warning

Experimental API

Parameters

exprinfo (str / None) - A text string helping to determine if we should strip AssertionError from the output. Defaults to the exception message/__str__().

classmethod for_later()

Return an unfilled ExceptionInfo.

fill_unfilled(exc_info)

Fill an unfilled ExceptionInfo created with for_later().

property type: type[E]

The exception class.

property value: E

The exception value.

property tb: TracebackType

The exception raw traceback.

property typename: str

The type name of the exception.

property traceback: Traceback

The traceback.

exconly (tryshort=False)

Return the exception as a string.

When 'tryshort' resolves to True, and the exception is an AssertionError, only the actual exception part of the exception representation is returned (so 'AssertionError: 'is removed from the beginning).

errisinstance(exc)

Return True if the exception is an instance of exc.

Consider using isinstance (excinfo.value, exc) instead.

Return str()able representation of this exception info.

Parameters

- **showlocals** (bool) Show locals per traceback entry. Ignored if style=="native".
- **style** (*str*) long|short|line|no|native|value traceback style.
- **abspath** (bool) If paths should be changed to absolute or left unchanged.
- **tbfilter** (bool | Callable[[ExceptionInfo[BaseException]], Traceback]) A filter for traceback entries.
 - If false, don't hide any entries.
 - If true, hide internal entries and entries that contain a local variable __traceback-hide__ = True.
 - If a callable, delegates the filtering to the callable.

Ignored if style is "native".

- **funcargs** (bool) Show fixtures ("funcargs" for legacy purposes) per traceback entry.
- **truncate_locals** (bool) With showlocals==True, make sure locals can be safely represented as strings.

- **truncate_args** (bool) With showargs==True, make sure args can be safely represented as strings.
- **chain** (bool) If chained exceptions in Python 3 should be shown.

Changed in version 3.9: Added the chain parameter.

match (regexp)

Check whether the regular expression regexp matches the string representation of the exception using re. search().

If it matches True is returned, otherwise an AssertionError is raised.

group_contains (expected_exception, *, match=None, depth=None)

Check whether a captured exception group contains a matching exception.

Parameters

- expected_exception (Type[BaseException] / Tu-ple[Type[BaseException]]) The expected exception type, or a tuple if one of multiple possible exception types are expected.
- match (str / Pattern[str] / None) If specified, a string containing a regular expression, or a regular expression object, that is tested against the string representation of the exception and its PEP-678 https://peps.python.org/pep-0678/ __notes__using re.search().

To match a literal string that may contain special characters, the pattern can first be escaped with re.escape().

• **depth** (Optional[int]) - If None, will search for a matching exception at any nesting depth. If >= 1, will only match an exception if it's at the specified depth (depth = 1 being the exceptions contained within the topmost exception group).

Added in version 8.0.

ExitCode

final class ExitCode (value, names=<not given>, *values, module=None, qualname=None, type=None, start=1, boundary=None)

Encodes the valid exit codes by pytest.

Currently users and plugins may supply other exit codes as well.

Added in version 5.0.

OK = 0

Tests passed.

 $TESTS_FAILED = 1$

Tests failed.

INTERRUPTED = 2

pytest was interrupted.

INTERNAL ERROR = 3

An internal error got in the way.

```
USAGE_ERROR = 4
    pytest was misused.
NO_TESTS_COLLECTED = 5
    pytest couldn't find tests.
```

FixtureDef

final class FixtureDef

Bases: Generic[FixtureValue]
A container for a fixture definition.

Note: At this time, only explicitly documented fields and methods are considered public stable API.

```
property scope: Literal['session', 'package', 'module', 'class',
'function']
    Scope string, one of "function", "class", "module", "package", "session".
execute (request)
```

Return the value of this fixture, executing it if not cached.

MarkDecorator

class MarkDecorator

A decorator for applying a mark on test functions and classes.

MarkDecorators are created with pytest.mark:

```
mark1 = pytest.mark.NAME # Simple MarkDecorator
mark2 = pytest.mark.NAME(name1=value) # Parametrized MarkDecorator
```

and can then be applied as decorators to test functions:

```
@mark2
def test_function():
    pass
```

When a MarkDecorator is called, it does the following:

- 1. If called with a single class as its only positional argument and no additional keyword arguments, it attaches the mark to the class so it gets applied automatically to all test cases found in that class.
- 2. If called with a single function as its only positional argument and no additional keyword arguments, it attaches the mark to the function, containing all the arguments already stored internally in the MarkDecorator.
- 3. When called in any other case, it returns a new MarkDecorator instance with the original MarkDecorator's content updated with the arguments passed to this call.

Note: The rules above prevent a MarkDecorator from storing only a single function or class reference as its positional argument with no additional keyword or positional arguments. You can work around this by using with_args().

```
property name: str
Alias for mark.name.

property args: tuple[Any, ...]
Alias for mark.args.

property kwargs: Mapping[str, Any]
Alias for mark.kwargs.

with_args(*args, **kwargs)

Return a MarkDecorator with extra arguments added.
```

Unlike calling the MarkDecorator, with_args() can be used even if the sole argument is a callable/class.

MarkGenerator

final class MarkGenerator

Factory for MarkDecorator objects - exposed as a pytest.mark singleton instance.

Example:

```
import pytest
@pytest.mark.slowtest
def test_function():
    pass
```

applies a 'slowtest' Mark on test_function.

Mark

final class Mark

A pytest mark.

```
name: str
```

Name of the mark.

```
args: tuple[Any, ...]
```

Positional arguments of the mark decorator.

```
kwargs: Mapping[str, Any]
```

Keyword arguments of the mark decorator.

```
combined_with(other)
```

Return a new Mark which is a combination of this Mark and another Mark.

Combines by appending args and merging kwargs.

Parameters

other (Mark) - The mark to combine with.

Return type

Mark

Metafunc

final class Metafunc

Objects passed to the pytest_generate_tests hook.

They help to inspect a test function and to generate tests according to test configuration or values specified in the class or module where a test function is defined.

definition

Access to the underlying _pytest.python.FunctionDefinition.

config

Access to the pytest. Config object for the test session.

module

The module object where the test function is defined in.

function

Underlying Python test function.

fixturenames

Set of fixture names required by the test function.

cls

Class object where the test function is defined in or None.

```
parametrize (argnames, argvalues, indirect=False, ids=None, scope=None, *, _param_mark=None)
```

Add new invocations to the underlying test function using the list of argvalues for the given argnames. Parametrization is performed during the collection phase. If you need to setup expensive resources see about setting indirect to do it rather than at test setup time.

Can be called multiple times per test function (but only on different argument names), in which case each call parametrizes all previous parametrizations, e.g.

Parameters

- argnames (str / Sequence[str]) A comma-separated string denoting one or more argument names, or a list/tuple of argument strings.
- argvalues (Iterable[_pytest.mark.structures.ParameterSet | Sequence[object] | object]) The list of argvalues determines how often a test is invoked with different argument values.

If only one argname was specified argvalues is a list of values. If N argnames were specified, argvalues must be a list of N-tuples, where each tuple-element specifies a value for its respective argname.

- indirect (bool | Sequence[str]) A list of arguments' names (subset of argnames) or a boolean. If True the list contains all names from the argnames. Each argvalue corresponding to an argname in this list will be passed as request.param to its respective argname fixture function so that it can perform more expensive setups during the setup phase of a test rather than at collection time.
- ids (Iterable[object | None] | Callable[[Any], object | None] | None) Sequence of (or generator for) ids for argvalues, or a callable to return part of the id for each argvalue.

With sequences (and generators like itertools.count()) the returned ids should be of type string, int, float, bool, or None. They are mapped to the corresponding index in argyalues. None means to use the auto-generated id.

If it is a callable it will be called for each entry in argvalues, and the return value is used as part of the auto-generated id for the whole set (where parts are joined with dashes ("-")). This is useful to provide more specific ids for certain items, e.g. dates. Returning None will use an auto-generated id.

If no ids are provided they will be generated automatically from the argvalues.

• scope (Literal['session', 'package', 'module', 'class', 'function'] / None) – If specified it denotes the scope of the parameters. The scope is used for grouping tests by parameter instances. It will also override any fixture-function defined scope, allowing to set a dynamic scope using test context or configuration.

Parser

final class Parser

Parser for command line arguments and ini-file values.

Variables

extra_info – Dict of generic param -> value to display in case there's an error processing the command line arguments.

getgroup (name, description=", after=None)

Get (or create) a named option Group.

Parameters

- name (str) Name of the option group.
- **description** (str) Long description for –help output.
- after (str / None) Name of another group, used for ordering -help output.

Returns

The option group.

Return type

OptionGroup

The returned group object has an addoption method with the same signature as parser.addoption but will be shown in the respective group in the output of pytest --help.

```
addoption (*opts, **attrs)
```

Register a command line option.

Parameters

• **opts** (*str*) – Option names, can be short or long options.

• attrs (Any) - Same attributes as the argparse library's add_argument() function accepts.

After command line parsing, options are available on the pytest config object via config.option. NAME where NAME is usually set by passing a dest attribute, for example addoption("--long", dest="NAME", ...).

```
parse_known_args (args, namespace=None)
```

Parse the known arguments at this point.

Returns

An argparse namespace object.

Return type

Namespace

parse_known_and_unknown_args (args, namespace=None)

Parse the known arguments at this point, and also return the remaining unknown arguments.

Returns

A tuple containing an argparse namespace object for the known arguments, and a list of the unknown arguments.

Return type

```
tuple[Namespace, list[str]]
```

addini (name, help, type=None, default=<notset>)

Register an ini-file option.

Parameters

- name (str) Name of the ini-variable.
- type (Literal['string', 'paths', 'pathlist', 'args', 'linelist', 'bool'] | None) Type of the variable. Can be:
 - string: a string
 - bool: a boolean
 - args: a list of strings, separated as in a shell
 - linelist: a list of strings, separated by line breaks
 - paths: a list of pathlib.Path, separated as in a shell
 - pathlist: a list of py.path, separated as in a shell

For paths and pathlist types, they are considered relative to the ini-file. In case the execution is happening without an ini-file defined, they will be considered relative to the current working directory (for example with --override-ini).

Added in version 7.0: The paths variable type.

Added in version 8.1: Use the current working directory to resolve paths and pathlist in the absence of an ini-file.

Defaults to string if None or not passed.

• **default** (Any) – Default value if no ini-file option exists but is queried.

The value of ini-variables can be retrieved via a call to config.getini(name).

OptionGroup

class OptionGroup

A group of options shown in its own section.

```
addoption (*opts, **attrs)
```

Add an option to this group.

If a shortened version of a long option is specified, it will be suppressed in the help. addoption('--twowords', '--two-words') results in help showing --two-words only, but --twowords gets accepted and the automatic destination is in args.twowords.

Parameters

- opts (str) Option names, can be short or long options.
- attrs (Any) Same attributes as the argparse library's add_argument() function accepts.

PytestPluginManager

final class PytestPluginManager

Bases: PluginManager

A pluggy.PluginManager with additional pytest-specific functionality:

- Loading plugins from the command line, PYTEST_PLUGINS env variable and pytest_plugins global variables found in plugins being loaded.
- conftest.py loading during start-up.

```
register (plugin, name=None)
```

Register a plugin and return its name.

Parameters

name (str | None) - The name under which to register the plugin. If not specified, a name is generated using get_canonical_name().

Returns

The plugin name. If the name is blocked from registering, returns None.

Return type

str | None

If the plugin is already registered, raises a ValueError.

```
getplugin(name)
```

hasplugin (name)

Return whether a plugin with the given name is registered.

import_plugin (modname, consider_entry_points=False)

Import a plugin with modname.

If consider_entry_points is True, entry point names are also considered to find a plugin.

add_hookcall_monitoring(before, after)

Add before/after tracing functions for all hooks.

Returns an undo function which, when called, removes the added tracers.

before (hook_name, hook_impls, kwargs) will be called ahead of all hook calls and receive a hookcaller instance, a list of HookImpl instances and the keyword arguments for the hook call.

after (outcome, hook_name, hook_impls, kwargs) receives the same arguments as before but also a Result object which represents the result of the overall hook call.

add_hookspecs (module_or_class)

Add new hook specifications defined in the given module_or_class.

Functions are recognized as hook specifications if they have been decorated with a matching Hookspec-Marker.

check_pending()

Verify that all hooks which have not been verified against a hook specification are optional, otherwise raise PluginValidationError.

enable_tracing()

Enable tracing of hook calls.

Returns an undo function which, when called, removes the added tracing.

get_canonical_name (plugin)

Return a canonical name for a plugin object.

Note that a plugin may be registered under a different name specified by the caller of register (plugin, name). To obtain the name of a registered plugin use get_name (plugin) instead.

get_hookcallers (plugin)

Get all hook callers for the specified plugin.

Returns

The hook callers, or None if plugin is not registered in this plugin manager.

Return type

list[HookCaller] | None

get_name (plugin)

Return the name the plugin is registered under, or None if is isn't.

get_plugin (name)

Return the plugin registered under the given name, if any.

get_plugins()

Return a set of all registered plugin objects.

has_plugin (name)

Return whether a plugin with the given name is registered.

is_blocked(name)

Return whether the given plugin name is blocked.

is_registered(plugin)

Return whether the plugin is already registered.

list_name_plugin()

Return a list of (name, plugin) pairs for all registered plugins.

list_plugin_distinfo()

Return a list of (plugin, distinfo) pairs for all setuptools-registered plugins.

load_setuptools_entrypoints (group, name=None)

Load modules from querying the specified setuptools group.

Parameters

- **group** (str) Entry point group to load plugins.
- name (str / None) If given, loads only plugins with the given name.

Returns

The number of plugins loaded by this call.

Return type

int

set_blocked(name)

Block registrations of the given name, unregister if already registered.

subset_hook_caller (name, remove_plugins)

Return a proxy <code>HookCaller</code> instance for the named method which manages calls to all registered plugins except the ones from remove_plugins.

unblock (name)

Unblocks a name.

Returns whether the name was actually blocked.

```
unregister (plugin=None, name=None)
```

Unregister a plugin and all of its hook implementations.

The plugin can be specified either by the plugin object or the plugin name. If both are specified, they must agree.

Returns the unregistered plugin, or None if not found.

project_name: Final

The project name.

hook: Final

The "hook relay", used to call a hook on all registered plugins. See Calling hooks.

trace: Final[_tracing.TagTracerSub]

The tracing entry point. See Built-in tracing.

TerminalReporter

```
final class TerminalReporter(config, file=None)
```

```
wrap_write(content, *, flush=False, margin=8, line_sep='\n', **markup)
```

Wrap message with margin for progress info.

```
rewrite (line, **markup)
```

Rewinds the terminal cursor to the beginning and writes the given line.

Parameters

erase – If True, will also add spaces until the full terminal width to ensure previous lines are properly erased.

The rest of the keyword arguments are markup instructions.

```
build_summary_stats_line()
```

Build the parts used in the last summary stats line.

The summary stats line is the line shown at the end, "=== 12 passed, 2 errors in Xs===".

This function builds a list of the "parts" that make up for the text in that line, in the example above it would be:

```
[
    ("12 passed", {"green": True}),
    ("2 errors", {"red": True}
]
```

That last dict for each line is a "markup dictionary", used by TerminalWriter to color output.

The final color of the line is also determined by this function, and is the second element of the returned tuple.

TestReport

final class TestReport

Bases: BaseReport

Basic test report object (also used for setup and teardown calls if they fail).

Reports can contain arbitrary extra attributes.

nodeid: str

Normalized collection nodeid.

```
location: tuple[str, int | None, str]
```

A (filesystempath, lineno, domaininfo) tuple indicating the actual location of a test item - it might be different from the collected one e.g. if a method is inherited from a different module. The filesystempath may be relative to config.rootdir. The line number is 0-based.

```
keywords: Mapping[str, Any]
```

A name -> value dictionary containing all keywords and markers associated with a test invocation.

```
outcome: Literal['passed', 'failed', 'skipped']
```

Test outcome, always one of "passed", "failed", "skipped".

```
longrepr: None | ExceptionInfo[BaseException] | tuple[str, int, str] | str
| TerminalRepr
```

None or a failure representation.

```
when: str | None
```

One of 'setup', 'call', 'teardown' to indicate runtest phase.

user_properties

User properties is a list of tuples (name, value) that holds user defined properties of the test.

```
sections: list[tuple[str, str]]
```

Tuples of str (heading, content) with extra information for the test report. Used by pytest to add text captured from stdout, stderr, and intercepted logging events. May be used by other plugins to add arbitrary information to reports.

```
duration: float
```

Time it took to run just the test.

```
start: float
```

The system time when the call started, in seconds since the epoch.

```
stop: float
```

The system time when the call ended, in seconds since the epoch.

```
classmethod from_item_and_call(item, call)
```

Create and fill a TestReport with standard item and call info.

Parameters

- item (Item) The item.
- call (CallInfo[None]) The call info.

property caplog: str

Return captured log lines, if log capturing is enabled.

Added in version 3.5.

property capstderr: str

Return captured text from stderr, if capturing is enabled.

Added in version 3.0.

property capstdout: str

Return captured text from stdout, if capturing is enabled.

Added in version 3.0.

property count_towards_summary: bool

Experimental Whether this report should be counted towards the totals shown at the end of the test session: "1 passed, 1 failure, etc".



This function is considered **experimental**, so beware that it is subject to changes even in patch releases.

property failed: bool

Whether the outcome is failed.

property fspath: str

The path portion of the reported node, as a string.

property head_line: str | None

Experimental The head line shown with longrepr output for this report, more commonly during traceback representation during failures:

```
_____ Test.foo ____
```

In the example above, the head_line is "Test.foo".

1 Note

This function is considered experimental, so beware that it is subject to changes even in patch releases.

property longreprtext: str

Read-only property that returns the full string representation of longrepr.

Added in version 3.0.

property passed: bool

Whether the outcome is passed.

property skipped: bool

Whether the outcome is skipped.

TestShortLogReport

class TestShortLogReport

Used to store the test status result category, shortletter and verbose word. For example "rerun", "R", ("RERUN", {"yellow": True}).

Variables

- category The class of result, for example "passed", "skipped", "error", or the empty string.
- letter The short letter shown as testing progresses, for example ".", "s", "E", or the empty string.
- word Verbose word is shown as testing progresses in verbose mode, for example "PASSED", "SKIPPED", "ERROR", or the empty string.

```
category: str
    Alias for field number 0
letter: str
    Alias for field number 1
word: str | tuple[str, Mapping[str, bool]]
```

Alias for field number 2

Result

Result object used within hook wrappers, see Result in the pluggy documentation for more information.

Stash

class Stash

Stash is a type-safe heterogeneous mutable mapping that allows keys and value types to be defined separately from where it (the Stash) is created.

Usually you will be given an object which has a Stash, for example Config or a Node:

```
stash: Stash = some_object.stash
```

If a module or plugin wants to store data in this Stash, it creates StashKeys for its keys (at the module level):

```
# At the top-level of the module
some_str_key = StashKey[str]()
some_bool_key = StashKey[bool]()
```

To store information:

```
# Value type must match the key.
stash[some_str_key] = "value"
stash[some_bool_key] = True
```

To retrieve the information:

```
# The static type of some_str is str.
     some_str = stash[some_str_key]
      # The static type of some_bool is bool.
     some_bool = stash[some_bool_key]
     Added in version 7.0.
      __setitem__(key, value)
          Set a value for key.
     __getitem__(key)
          Get the value for key.
          Raises KeyError if the key wasn't set before.
     get (key, default)
          Get the value for key, or return default if the key wasn't set before.
     setdefault (key, default)
          Return the value of key if already set, otherwise set the value of key to default and return default.
       _delitem__(key)
          Delete the value for key.
          Raises KeyError if the key wasn't set before.
      __contains__(key)
          Return whether key was set.
      __len__()
          Return how many items exist in the stash.
class StashKey
     Bases: Generic[T]
     StashKey is an object used as a key to a Stash.
     A StashKey is associated with the type T of the value of the key.
```

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A StashKey is unique and cannot conflict with another key.

Added in version 7.0.

3.4.8 Global Variables

pytest treats some global variables in a special manner when defined in a test module or conftest.py files.

collect_ignore

Tutorial: Customizing test collection

Can be declared in *conftest.py files* to exclude test directories or modules. Needs to be a list of paths (str, pathlib. Path or any os.PathLike).

```
collect_ignore = ["setup.py"]
```

collect_ignore_glob

Tutorial: Customizing test collection

Can be declared in *conftest.py files* to exclude test directories or modules with Unix shell-style wildcards. Needs to be list[str] where str can contain glob patterns.

```
collect_ignore_glob = ["*_ignore.py"]
```

pytest_plugins

Tutorial: Requiring/Loading plugins in a test module or conftest file

Can be declared at the **global** level in *test modules* and *conftest.py files* to register additional plugins. Can be either a str or Sequence [str].

```
pytest_plugins = "myapp.testsupport.myplugin"
```

```
pytest_plugins = ("myapp.testsupport.tools", "myapp.testsupport.regression")
```

pytestmark

Tutorial: Marking whole classes or modules

Can be declared at the **global** level in *test modules* to apply one or more *marks* to all test functions and methods. Can be either a single mark or a list of marks (applied in left-to-right order).

```
import pytest

pytestmark = pytest.mark.webtest
```

```
import pytest

pytestmark = [pytest.mark.integration, pytest.mark.slow]
```

3.4.9 Environment Variables

Environment variables that can be used to change pytest's behavior.

CI

When set (regardless of value), pytest acknowledges that is running in a CI process. Alternative to BUILD_NUMBER variable. See also ci-pipelines.

BUILD NUMBER

When set (regardless of value), pytest acknowledges that is running in a CI process. Alternative to CI variable. See also ci-pipelines.

PYTEST ADDOPTS

This contains a command-line (parsed by the py:mod:shlex module) that will be **prepended** to the command line given by the user, see *Builtin configuration file options* for more information.

PYTEST_VERSION

This environment variable is defined at the start of the pytest session and is undefined afterwards. It contains the value of pytest.__version__, and among other things can be used to easily check if a code is running from within a pytest run.

PYTEST_CURRENT_TEST

This is not meant to be set by users, but is set by pytest internally with the name of the current test so other processes can inspect it, see *PYTEST_CURRENT_TEST environment variable* for more information.

PYTEST_DEBUG

When set, pytest will print tracing and debug information.

PYTEST DISABLE PLUGIN AUTOLOAD

When set, disables plugin auto-loading through entry point packaging metadata. Only explicitly specified plugins will be loaded.

PYTEST_PLUGINS

Contains comma-separated list of modules that should be loaded as plugins:

```
export PYTEST_PLUGINS=mymodule.plugin,xdist
```

PYTEST THEME

Sets a pygment style to use for the code output.

PYTEST_THEME_MODE

Sets the *PYTEST_THEME* to be either *dark* or *light*.

PY_COLORS

When set to 1, pytest will use color in terminal output. When set to 0, pytest will not use color. PY_COLORS takes precedence over NO_COLOR and FORCE_COLOR.

NO_COLOR

When set to a non-empty string (regardless of value), pytest will not use color in terminal output. PY_COLORS takes precedence over NO_COLOR, which takes precedence over FORCE_COLOR. See no-color.org for other libraries supporting this community standard.

FORCE_COLOR

When set to a non-empty string (regardless of value), pytest will use color in terminal output. PY_COLORS and NO_COLOR take precedence over FORCE_COLOR.

3.4.10 Exceptions

final exception UsageError

Bases: Exception

Error in pytest usage or invocation.

final exception FixtureLookupError

Bases: LookupError

Could not return a requested fixture (missing or invalid).

3.4.11 Warnings

Custom warnings generated in some situations such as improper usage or deprecated features.

class PytestWarning

Bases: UserWarning

Base class for all warnings emitted by pytest.

class PytestAssertRewriteWarning

Bases: PytestWarning

Warning emitted by the pytest assert rewrite module.

class PytestCacheWarning

Bases: PytestWarning

Warning emitted by the cache plugin in various situations.

class PytestCollectionWarning

Bases: PytestWarning

Warning emitted when pytest is not able to collect a file or symbol in a module.

class PytestConfigWarning

Bases: PytestWarning

Warning emitted for configuration issues.

class PytestDeprecationWarning

Bases: PytestWarning, DeprecationWarning

Warning class for features that will be removed in a future version.

class PytestExperimentalApiWarning

Bases: PytestWarning, FutureWarning

Warning category used to denote experiments in pytest.

Use sparingly as the API might change or even be removed completely in a future version.

class PytestReturnNotNoneWarning

Bases: PytestWarning

Warning emitted when a test function is returning value other than None.

class PytestRemovedIn9Warning

Bases: PytestDeprecationWarning

Warning class for features that will be removed in pytest 9.

class PytestUnhandledCoroutineWarning

Bases: PytestReturnNotNoneWarning

Warning emitted for an unhandled coroutine.

A coroutine was encountered when collecting test functions, but was not handled by any async-aware plugin. Coroutine test functions are not natively supported.

class PytestUnknownMarkWarning

Bases: PytestWarning

Warning emitted on use of unknown markers.

See *How to mark test functions with attributes* for details.

class PytestUnraisableExceptionWarning

Bases: PytestWarning

An unraisable exception was reported.

Unraisable exceptions are exceptions raised in ___del___ implementations and similar situations when the exception cannot be raised as normal.

class PytestUnhandledThreadExceptionWarning

Bases: PytestWarning

An unhandled exception occurred in a Thread.

Such exceptions don't propagate normally.

Consult the Internal pytest warnings section in the documentation for more information.

3.4.12 Configuration Options

Here is a list of builtin configuration options that may be written in a pytest.ini(or.pytest.ini), pyproject.toml, tox.ini, or setup.cfg file, usually located at the root of your repository.

To see each file format in details, see Configuration file formats.

▲ Warning

Usage of setup.cfg is not recommended except for very simple use cases. .cfg files use a different parser than pytest.ini and tox.ini which might cause hard to track down problems. When possible, it is recommended to use the latter files, or pyproject.toml, to hold your pytest configuration.

Configuration options may be overwritten in the command-line by using -o/--override-ini, which can also be passed multiple times. The expected format is name=value. For example:

```
pytest -o console_output_style=classic -o cache_dir=/tmp/mycache
```

addopts

Add the specified OPTS to the set of command line arguments as if they had been specified by the user. Example: if you have this ini file content:

```
# content of pytest.ini
[pytest]
addopts = --maxfail=2 -rf # exit after 2 failures, report fail info
```

issuing pytest test_hello.py actually means:

```
pytest --maxfail=2 -rf test_hello.py
```

Default is to add no options.

cache_dir

Sets the directory where the cache plugin's content is stored. Default directory is .pytest_cache which is created in *rootdir*. Directory may be relative or absolute path. If setting relative path, then directory is created relative to *rootdir*. Additionally, a path may contain environment variables, that will be expanded. For more information about cache plugin please refer to *How to re-run failed tests and maintain state between test runs*.

consider_namespace_packages

Controls if pytest should attempt to identify namespace packages when collecting Python modules. Default is False.

Set to True if the package you are testing is part of a namespace package.

Only native namespace packages are supported, with no plans to support legacy namespace packages.

Added in version 8.1.

console_output_style

Sets the console output style while running tests:

- classic: classic pytest output.
- progress: like classic pytest output, but with a progress indicator.
- progress-even-when-capture-no: allows the use of the progress indicator even when capture=no.
- count: like progress, but shows progress as the number of tests completed instead of a percent.

The default is progress, but you can fallback to classic if you prefer or the new mode is causing unexpected problems:

```
# content of pytest.ini
[pytest]
console_output_style = classic
```

doctest_encoding

Default encoding to use to decode text files with docstrings. See how pytest handles doctests.

doctest_optionflags

One or more doctest flag names from the standard doctest module. See how pytest handles doctests.

empty_parameter_set_mark

Allows to pick the action for empty parametersets in parameterization

- skip skips tests with an empty parameterset (default)
- xfail marks tests with an empty parameterset as xfail(run=False)
- fail_at_collect raises an exception if parametrize collects an empty parameter set

```
# content of pytest.ini
[pytest]
empty_parameter_set_mark = xfail
```

1 Note

The default value of this option is planned to change to xfail in future releases as this is considered less error prone, see #3155 for more details.

faulthandler_timeout

Dumps the tracebacks of all threads if a test takes longer than X seconds to run (including fixture setup and teardown). Implemented using the faulthandler.dump_traceback_later() function, so all caveats there apply.

```
# content of pytest.ini
[pytest]
faulthandler_timeout=5
```

For more information please refer to faulthandler.

filterwarnings

Sets a list of filters and actions that should be taken for matched warnings. By default all warnings emitted during the test session will be displayed in a summary at the end of the test session.

```
# content of pytest.ini
[pytest]
filterwarnings =
   error
    ignore::DeprecationWarning
```

This tells pytest to ignore deprecation warnings and turn all other warnings into errors. For more information please refer to How to capture warnings.

junit_duration_report

Added in version 4.1.

Configures how durations are recorded into the JUnit XML report:

- total (the default): duration times reported include setup, call, and teardown times.
- call: duration times reported include only call times, excluding setup and teardown.

```
[pytest]
junit_duration_report = call
```

junit_family

Added in version 4.2.

Changed in version 6.1: Default changed to xunit2.

Configures the format of the generated JUnit XML file. The possible options are:

- xunit1 (or legacy): produces old style output, compatible with the xunit 1.0 format.
- xunit2: produces xunit 2.0 style output, which should be more compatible with latest Jenkins versions. This is the default.

```
[pytest]
junit_family = xunit2
```

junit_logging

Added in version 3.5.

Changed in version 5.4: log, all, out-err options added.

Configures if captured output should be written to the JUnit XML file. Valid values are:

- log: write only logging captured output.
- system-out: write captured stdout contents.
- system-err: write captured stderr contents.
- out-err: write both captured stdout and stderr contents.
- all: write captured logging, stdout and stderr contents.
- no (the default): no captured output is written.

```
[pytest]
junit_logging = system-out
```

junit_log_passing_tests

Added in version 4.6.

If junit_logging != "no", configures if the captured output should be written to the JUnit XML file for passing tests. Default is True.

```
[pytest]
junit_log_passing_tests = False
```

junit_suite_name

To set the name of the root test suite xml item, you can configure the junit_suite_name option in your config file:

```
[pytest]
junit_suite_name = my_suite
```

log_auto_indent

Allow selective auto-indentation of multiline log messages.

Supports command line option --log-auto-indent [value] and config option log_auto_indent = [value] to set the auto-indentation behavior for all logging.

[value] can be:

- True or "On" Dynamically auto-indent multiline log messages
- False or "Off" or 0 Do not auto-indent multiline log messages (the default behavior)
- [positive integer] auto-indent multiline log messages by [value] spaces

```
[pytest]
log_auto_indent = False
```

Supports passing kwarg extra={"auto_indent": [value]} to calls to logging.log() to specify auto-indentation behavior for a specific entry in the log. extra kwarg overrides the value specified on the command line or in the config.

log_cli

Enable log display during test run (also known as "live logging"). The default is False.

```
[pytest]
log_cli = True
```

log_cli_date_format

Sets a time.strftime()-compatible string that will be used when formatting dates for live logging.

```
[pytest]
log_cli_date_format = %Y-%m-%d %H:%M:%S
```

For more information, see Live Logs.

log_cli_format

Sets a logging-compatible string used to format live logging messages.

```
[pytest]
log_cli_format = %(asctime)s %(levelname)s %(message)s
```

For more information, see *Live Logs*.

log_cli_level

Sets the minimum log message level that should be captured for live logging. The integer value or the names of the levels can be used.

```
[pytest]
log_cli_level = INFO
```

For more information, see *Live Logs*.

log_date_format

Sets a time.strftime()-compatible string that will be used when formatting dates for logging capture.

```
[pytest]
log_date_format = %Y-%m-%d %H:%M:%S
```

For more information, see *How to manage logging*.

log_file

Sets a file name relative to the current working directory where log messages should be written to, in addition to the other logging facilities that are active.

```
[pytest]
log_file = logs/pytest-logs.txt
```

For more information, see *How to manage logging*.

log_file_date_format

Sets a time.strftime()-compatible string that will be used when formatting dates for the logging file.

```
[pytest]
log_file_date_format = %Y-%m-%d %H:%M:%S
```

For more information, see *How to manage logging*.

log_file_format

Sets a logging-compatible string used to format logging messages redirected to the logging file.

```
[pytest]
log_file_format = %(asctime)s %(levelname)s %(message)s
```

For more information, see *How to manage logging*.

log_file_level

Sets the minimum log message level that should be captured for the logging file. The integer value or the names of the levels can be used.

```
[pytest]
log_file_level = INFO
```

For more information, see *How to manage logging*.

log_format

Sets a logging-compatible string used to format captured logging messages.

```
[pytest]
log_format = %(asctime)s %(levelname)s %(message)s
```

For more information, see *How to manage logging*.

log_level

Sets the minimum log message level that should be captured for logging capture. The integer value or the names of the levels can be used.

```
[pytest]
log_level = INFO
```

For more information, see *How to manage logging*.

markers

When the --strict-markers or --strict command-line arguments are used, only known markers - defined in code by core pytest or some plugin - are allowed.

You can list additional markers in this setting to add them to the whitelist, in which case you probably want to add --strict-markers to addopts to avoid future regressions:

```
[pytest]
addopts = --strict-markers
markers =
    slow
    serial
```

1 Note

The use of --strict-markers is highly preferred. --strict was kept for backward compatibility only and may be confusing for others as it only applies to markers and not to other options.

minversion

Specifies a minimal pytest version required for running tests.

```
# content of pytest.ini
[pytest]
minversion = 3.0 # will fail if we run with pytest-2.8
```

norecursedirs

Set the directory basename patterns to avoid when recursing for test discovery. The individual (fnmatch-style) patterns are applied to the basename of a directory to decide if to recurse into it. Pattern matching characters:

```
* matches everything
? matches any single character
[seq] matches any character in seq
[!seq] matches any char not in seq
```

Default patterns are '*.egg', '.*', '_darcs', 'build', 'CVS', 'dist', 'node_modules', 'venv', '{arch}'. Setting a norecursedirs replaces the default. Here is an example of how to avoid certain directories:

```
[pytest]
norecursedirs = .svn _build tmp*
```

This would tell pytest to not look into typical subversion or sphinx-build directories or into any tmp prefixed directory.

Additionally, pytest will attempt to intelligently identify and ignore a virtualenv. Any directory deemed to be the root of a virtual environment will not be considered during test collection unless --collect-in-virtualenv is given. Note also that norecursedirs takes precedence over --collect-in-virtualenv; e.g. if you intend to run tests in a virtualenv with a base directory that matches '.*' you *must* override norecursedirs in addition to using the --collect-in-virtualenv flag.

python_classes

One or more name prefixes or glob-style patterns determining which classes are considered for test collection. Search for multiple glob patterns by adding a space between patterns. By default, pytest will consider any class prefixed with Test as a test collection. Here is an example of how to collect tests from classes that end in Suite:

```
[pytest]
python_classes = *Suite
```

Note that unittest. TestCase derived classes are always collected regardless of this option, as unittest's own collection framework is used to collect those tests.

python_files

One or more Glob-style file patterns determining which python files are considered as test modules. Search for multiple glob patterns by adding a space between patterns:

```
[pytest]
python_files = test_*.py check_*.py example_*.py
```

Or one per line:

```
[pytest]
python_files =
   test_*.py
   check_*.py
   example_*.py
```

By default, files matching test_*.py and *_test.py will be considered test modules.

python_functions

One or more name prefixes or glob-patterns determining which test functions and methods are considered tests. Search for multiple glob patterns by adding a space between patterns. By default, pytest will consider any function prefixed with test as a test. Here is an example of how to collect test functions and methods that end in _test:

```
[pytest]
python_functions = *_test
```

Note that this has no effect on methods that live on a unittest. TestCase derived class, as unittest's own collection framework is used to collect those tests.

See Changing naming conventions for more detailed examples.

pythonpath

Sets list of directories that should be added to the python search path. Directories will be added to the head of sys.path. Similar to the PYTHONPATH environment variable, the directories will be included in where Python will look for imported modules. Paths are relative to the *rootdir* directory. Directories remain in path for the duration of the test session.

```
[pytest]
pythonpath = src1 src2
```

required_plugins

A space separated list of plugins that must be present for pytest to run. Plugins can be listed with or without version specifiers directly following their name. Whitespace between different version specifiers is not allowed. If any one of the plugins is not found, emit an error.

```
[pytest]
required_plugins = pytest-django>=3.0.0,<4.0.0 pytest-html pytest-xdist>=1.0.0
```

testpaths

Sets list of directories that should be searched for tests when no specific directories, files or test ids are given in the command line when executing pytest from the *rootdir* directory. File system paths may use shell-style wildcards, including the recursive ** pattern.

Useful when all project tests are in a known location to speed up test collection and to avoid picking up undesired tests by accident.

```
[pytest]
testpaths = testing doc
```

This configuration means that executing:

```
pytest
```

has the same practical effects as executing:

```
pytest testing doc
```

tmp_path_retention_count

How many sessions should we keep the tmp_path directories, according to tmp_path_retention_policy.

```
[pytest]
tmp_path_retention_count = 3
```

Default: 3

tmp_path_retention_policy

Controls which directories created by the tmp_path fixture are kept around, based on test outcome.

- all: retains directories for all tests, regardless of the outcome.
- failed: retains directories only for tests with outcome error or failed.
- none: directories are always removed after each test ends, regardless of the outcome.

```
[pytest]
tmp_path_retention_policy = all
```

Default: all

usefixtures

List of fixtures that will be applied to all test functions; this is semantically the same to apply the @pytest. mark.usefixtures marker to all test functions.

```
[pytest]
usefixtures =
    clean_db
```

verbosity_assertions

Set a verbosity level specifically for assertion related output, overriding the application wide level.

```
[pytest]
verbosity_assertions = 2
```

Defaults to application wide verbosity level (via the -v command-line option). A special value of "auto" can be used to explicitly use the global verbosity level.

verbosity_test_cases

Set a verbosity level specifically for test case execution related output, overriding the application wide level.

```
[pytest]
verbosity_test_cases = 2
```

Defaults to application wide verbosity level (via the -v command-line option). A special value of "auto" can be used to explicitly use the global verbosity level.

xfail_strict

If set to True, tests marked with @pytest.mark.xfail that actually succeed will by default fail the test suite. For more information, see strict parameter.

```
[pytest]
xfail_strict = True
```

3.4.13 Command-line Flags

All the command-line flags can be obtained by running pytest --help:

```
$ pytest --help
usage: pytest [options] [file_or_dir] [file_or_dir] [...]
positional arguments:
  file_or_dir
```

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```
general:
 -k EXPRESSION
                        Only run tests which match the given substring
                        expression. An expression is a Python evaluable
                        expression where all names are substring-matched
                        against test names and their parent classes.
                        Example: -k 'test_method or test_other' matches all
                        test functions and classes whose name contains
                        'test_method' or 'test_other', while -k 'not
                        test_method' matches those that don't contain
                        'test_method' in their names. -k 'not test_method
                        and not test_other' will eliminate the matches.
                        Additionally keywords are matched to classes and
                        functions containing extra names in their
                        'extra_keyword_matches' set, as well as functions
                        which have names assigned directly to them. The
                        matching is case-insensitive.
 -m MARKEXPR
                        Only run tests matching given mark expression. For
                        example: -m 'mark1 and not mark2'.
 --markers
                        show markers (builtin, plugin and per-project ones).
 -x, --exitfirst
                       Exit instantly on first error or failed test
  --fixtures, --funcargs
                        Show available fixtures, sorted by plugin appearance
                        (fixtures with leading '_' are only shown with '-v')
 --fixtures-per-test
                        Show fixtures per test
  --pdb
                        Start the interactive Python debugger on errors or
                        KeyboardInterrupt
  --pdbcls=modulename:classname
                        Specify a custom interactive Python debugger for use
                        with --pdb.For example:
                        --pdbcls=IPython.terminal.debugger:TerminalPdb
  --trace
                        Immediately break when running each test
  --capture=method
                        Per-test capturing method: one of fd|sys|no|tee-sys
                        Shortcut for --capture=no
  --runxfail
                        Report the results of xfail tests as if they were
                        not marked
 --lf, --last-failed
                       Rerun only the tests that failed at the last run (or
                        all if none failed)
 --ff, --failed-first Run all tests, but run the last failures first. This
                        may re-order tests and thus lead to repeated fixture
                        setup/teardown.
 --nf, --new-first
                        Run tests from new files first, then the rest of the
                        tests sorted by file mtime
 --cache-show=[CACHESHOW]
                        Show cache contents, don't perform collection or
                        tests. Optional argument: glob (default: '*').
  --cache-clear
                        Remove all cache contents at start of test run
  --lfnf={all,none}, --last-failed-no-failures={all,none}
                        With ``--lf``, determines whether to execute tests
                        when there are no previously (known) failures or
                        when no cached ``lastfailed`` data was found.
                        ``all`` (the default) runs the full test suite
                        again. ``none`` just emits a message about no known
                        failures and exits successfully.
  --sw, --stepwise
                        Exit on test failure and continue from last failing
                        test next time
 --sw-skip, --stepwise-skip
```

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```
Ignore the first failing test but stop on the next
                        failing test. Implicitly enables --stepwise.
Reporting:
  --durations=N
                        Show N slowest setup/test durations (N=0 for all)
  --durations-min=N
                       Minimal duration in seconds for inclusion in slowest
                        list. Default: 0.005.
  -v, --verbose
                        Increase verbosity
  --no-header
                        Disable header
                      Disable summary
  --no-summary
  --no-fold-skipped Do not fold skipped tests in short summary.
  -q, --quiet
                       Decrease verbosity
  --verbosity=VERBOSE Set verbosity. Default: 0.
  -r chars
                        Show extra test summary info as specified by chars:
                        (f) ailed, (E) rror, (s) kipped, (x) failed, (X) passed,
                        (p) assed, (P) assed with output, (a) ll except passed
                        (p/P), or (A) ll. (w) arnings are enabled by default
                        (see --disable-warnings), 'N' can be used to reset
                        the list. (default: 'fE').
  --disable-warnings, --disable-pytest-warnings
                        Disable warnings summary
  -1, --showlocals
                      Show locals in tracebacks (disabled by default)
  --no-showlocals
                      Hide locals in tracebacks (negate --showlocals
                       passed through addopts)
  --tb=style
                        Traceback print mode
                        (auto/long/short/line/native/no)
  --xfail-tb
                        Show tracebacks for xfail (as long as --tb != no)
  --show-capture={no, stdout, stderr, log, all}
                        Controls how captured stdout/stderr/log is shown on
                        failed tests. Default: all.
                        Don't cut any tracebacks (default is to cut)
  --full-trace
                        Color terminal output (yes/no/auto)
  --color=color
  --code-highlight={yes, no}
                        Whether code should be highlighted (only if --color
                        is also enabled). Default: yes.
  --pastebin=mode Send failed|all info to bpaste.net pastebin service --junit-xml=path Create junit-xml style report file at given path
  --junit-prefix=str Prepend prefix to classnames in junit-xml output
pytest-warnings:
  -W PYTHONWARNINGS, --pythonwarnings=PYTHONWARNINGS
                        Set which warnings to report, see -W option of
                        Pvthon itself
                       Exit after first num failures or errors
  --maxfail=num
                      Any warnings encountered while parsing the `pytest`
  --strict-config
                        section of the configuration file raise errors
  --strict-markers
                        Markers not registered in the `markers` section of
                        the configuration file raise errors
                        (Deprecated) alias to --strict-markers
  --strict
  -c FILE, --config-file=FILE
                        Load configuration from `FILE` instead of trying to
                        locate one of the implicit configuration files.
  --continue-on-collection-errors
                        Force test execution even if collection errors occur
  --rootdir=ROOTDIR
                        Define root directory for tests. Can be relative
                        path: 'root_dir', './root_dir',
                        'root_dir/another_dir/'; absolute path:
```

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```
'/home/user/root_dir'; path with variables:
                        '$HOME/root_dir'.
collection:
  --collect-only, --co Only collect tests, don't execute them
                       Try to interpret all arguments as Python packages
 --pyargs
 --ignore=path
                       Ignore path during collection (multi-allowed)
  --ignore-glob=path
                       Ignore path pattern during collection (multi-
                       allowed)
 --deselect=nodeid_prefix
                       Deselect item (via node id prefix) during collection
                       (multi-allowed)
 --confcutdir=dir
                      Only load conftest.py's relative to specified dir
 --noconftest
                      Don't load any conftest.py files
 --keep-duplicates Keep duplicate tests
 --collect-in-virtualenv
                       Don't ignore tests in a local virtualenv directory
 --import-mode={prepend, append, importlib}
                       Prepend/append to sys.path when importing test
                       modules and conftest files. Default: prepend.
  --doctest-modules
                     Run doctests in all .py modules
  --doctest-report={none,cdiff,ndiff,udiff,only_first_failure}
                       Choose another output format for diffs on doctest
                       failure
 --doctest-glob=pat
                       Doctests file matching pattern, default: test*.txt
 --doctest-ignore-import-errors
                       Ignore doctest collection errors
 --doctest-continue-on-failure
                       For a given doctest, continue to run after the first
                       failure
test session debugging and configuration:
                 Base temporary directory for this test run.
  --basetemp=dir
                       (Warning: this directory is removed if it exists.)
                       Display pytest version and information about
 -V, --version
                       plugins. When given twice, also display information
                       about plugins.
 -h, --help
                       Show help message and configuration info
 -p name
                       Early-load given plugin module name or entry point
                       (multi-allowed). To avoid loading of plugins, use
                       the `no:` prefix, e.g. `no:doctest`.
                       Trace considerations of conftest.py files
  --trace-config
 --debug=[DEBUG_FILE_NAME]
                       Store internal tracing debug information in this log
                       file. This file is opened with 'w' and truncated as
                       a result, care advised. Default: pytestdebug.log.
 -o OVERRIDE_INI, --override-ini=OVERRIDE_INI
                       Override ini option with "option=value" style, e.g.
                        `-o xfail_strict=True -o cache_dir=cache`.
  --assert=MODE
                       Control assertion debugging tools.
                       'plain' performs no assertion debugging.
                       'rewrite' (the default) rewrites assert statements
                       in test modules on import to provide assert
                       expression information.
  --setup-only
                       Only setup fixtures, do not execute tests
                       Show setup of fixtures while executing tests
  --setup-show
 --setup-plan
                      Show what fixtures and tests would be executed but
```

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```
don't execute anything
logging:
  --log-level=LEVEL
                        Level of messages to catch/display. Not set by
                        default, so it depends on the root/parent log
                        handler's effective level, where it is "WARNING" by
                        default.
  --log-format=LOG_FORMAT
                        Log format used by the logging module
  --log-date-format=LOG_DATE_FORMAT
                       Log date format used by the logging module
  --log-cli-level=LOG_CLI_LEVEL
                        CLI logging level
  --log-cli-format=LOG_CLI_FORMAT
                       Log format used by the logging module
  --log-cli-date-format=LOG_CLI_DATE_FORMAT
                        Log date format used by the logging module
  --log-file=LOG_FILE Path to a file when logging will be written to
  --log-file-mode={w,a}
                        Log file open mode
  --log-file-level=LOG_FILE_LEVEL
                       Log file logging level
  --log-file-format=LOG_FILE_FORMAT
                        Log format used by the logging module
  --log-file-date-format=LOG_FILE_DATE_FORMAT
                        Log date format used by the logging module
  --log-auto-indent=LOG_AUTO_INDENT
                        Auto-indent multiline messages passed to the logging
                        module. Accepts true on, false off or an integer.
  --log-disable=LOGGER_DISABLE
                        Disable a logger by name. Can be passed multiple
                        times.
[pytest] ini-options in the first pytest.ini|tox.ini|setup.cfg|pyproject.toml file_
→found:
 markers (linelist): Register new markers for test functions
 empty_parameter_set_mark (string):
                       Default marker for empty parametersets
 norecursedirs (args): Directory patterns to avoid for recursion
                       Directories to search for tests when no files or
 testpaths (args):
                        directories are given on the command line
 filterwarnings (linelist):
                        Each line specifies a pattern for
                        warnings.filterwarnings. Processed after
                        -W/--pythonwarnings.
 consider_namespace_packages (bool):
                        Consider namespace packages when resolving module
                        names during import
 usefixtures (args): List of default fixtures to be used with this
                        project
 python_files (args): Glob-style file patterns for Python test module
                        discovery
 python_classes (args):
                        Prefixes or glob names for Python test class
                        discovery
 python_functions (args):
                                                                         (continues on next page)
```

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```
Prefixes or glob names for Python test function and
                      method discovery
disable_test_id_escaping_and_forfeit_all_rights_to_community_support (bool):
                      Disable string escape non-ASCII characters, might
                      cause unwanted side effects (use at your own risk)
console_output_style (string):
                      Console output: "classic", or with additional
                      progress information ("progress" (percentage) |
                      "count" | "progress-even-when-capture-no" (forces
                      progress even when capture=no)
verbosity_test_cases (string):
                      Specify a verbosity level for test case execution,
                      overriding the main level. Higher levels will
                      provide more detailed information about each test
                      case executed.
xfail_strict (bool): Default for the strict parameter of xfail markers
                      when not given explicitly (default: False)
tmp_path_retention_count (string):
                      How many sessions should we keep the `tmp_path`
                      directories, according to
                      `tmp_path_retention_policy`.
tmp_path_retention_policy (string):
                      Controls which directories created by the `tmp_path`
                      fixture are kept around, based on test outcome.
                      (all/failed/none)
enable_assertion_pass_hook (bool):
                      Enables the pytest_assertion_pass hook. Make sure to
                      delete any previously generated pyc cache files.
verbosity_assertions (string):
                      Specify a verbosity level for assertions, overriding
                      the main level. Higher levels will provide more
                      detailed explanation when an assertion fails.
junit_suite_name (string):
                      Test suite name for JUnit report
junit_logging (string):
                      Write captured log messages to JUnit report: one of
                      no|log|system-out|system-err|out-err|all
junit_log_passing_tests (bool):
                      Capture log information for passing tests to JUnit
                      report:
junit_duration_report (string):
                      Duration time to report: one of total | call
junit_family (string):
                      Emit XML for schema: one of legacy|xunit1|xunit2
doctest_optionflags (args):
                      Option flags for doctests
doctest_encoding (string):
                      Encoding used for doctest files
cache_dir (string): Cache directory path
log_level (string): Default value for --log-level
log_format (string): Default value for --log-format
log_date_format (string):
                      Default value for --log-date-format
                      Enable log display during test run (also known as
log_cli (bool):
                      "live logging")
log_cli_level (string):
                      Default value for --log-cli-level
```

```
log_cli_format (string):
                       Default value for --log-cli-format
 log_cli_date_format (string):
                       Default value for --log-cli-date-format
                      Default value for --log-file
 log_file (string):
 log_file_mode (string):
                       Default value for --log-file-mode
 log_file_level (string):
                       Default value for --log-file-level
 log_file_format (string):
                       Default value for --log-file-format
 log_file_date_format (string):
                       Default value for --log-file-date-format
 log_auto_indent (string):
                       Default value for --log-auto-indent
 pythonpath (paths): Add paths to sys.path
 faulthandler_timeout (string):
                       Dump the traceback of all threads if a test takes
                       more than TIMEOUT seconds to finish
 addopts (args):
                   Extra command line options
 minversion (string): Minimally required pytest version
 required_plugins (args):
                       Plugins that must be present for pytest to run
Environment variables:
                          When set (regardless of value), pytest knows it is running_
 СТ
→in a CI process and does not truncate summary info
BUILD_NUMBER
                         Equivalent to CI
 PYTEST ADDOPTS
                         Extra command line options
 PYTEST_PLUGINS
                         Comma-separated plugins to load during startup
 PYTEST_DISABLE_PLUGIN_AUTOLOAD Set to disable plugin auto-loading
                          Set to enable debug tracing of pytest's internals
 PYTEST_DEBUG
to see available markers type: pytest --markers
to see available fixtures type: pytest --fixtures
(shown according to specified file_or_dir or current dir if not specified; fixtures_
⇒with leading '_' are only shown with the '-v' option
```

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CHAPTER

FOUR

EXPLANATION

4.1 Anatomy of a test

In the simplest terms, a test is meant to look at the result of a particular behavior, and make sure that result aligns with what you would expect. Behavior is not something that can be empirically measured, which is why writing tests can be challenging.

"Behavior" is the way in which some system **acts in response** to a particular situation and/or stimuli. But exactly *how* or *why* something is done is not quite as important as *what* was done.

You can think of a test as being broken down into four steps:

- 1. Arrange
- 2. Act
- 3. Assert
- 4. Cleanup

Arrange is where we prepare everything for our test. This means pretty much everything except for the "act". It's lining up the dominoes so that the act can do its thing in one, state-changing step. This can mean preparing objects, starting/killing services, entering records into a database, or even things like defining a URL to query, generating some credentials for a user that doesn't exist yet, or just waiting for some process to finish.

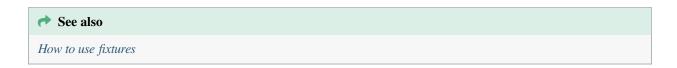
Act is the singular, state-changing action that kicks off the **behavior** we want to test. This behavior is what carries out the changing of the state of the system under test (SUT), and it's the resulting changed state that we can look at to make a judgement about the behavior. This typically takes the form of a function/method call.

Assert is where we look at that resulting state and check if it looks how we'd expect after the dust has settled. It's where we gather evidence to say the behavior does or does not align with what we expect. The assert in our test is where we take that measurement/observation and apply our judgement to it. If something should be green, we'd say assert thing == "green".

Cleanup is where the test picks up after itself, so other tests aren't being accidentally influenced by it.

At its core, the test is ultimately the **act** and **assert** steps, with the **arrange** step only providing the context. **Behavior** exists between **act** and **assert**.

4.2 About fixtures



```
★ See also
Fixtures reference
```

pytest fixtures are designed to be explicit, modular and scalable.

4.2.1 What fixtures are

In testing, a fixture provides a defined, reliable and consistent context for the tests. This could include environment (for example a database configured with known parameters) or content (such as a dataset).

Fixtures define the steps and data that constitute the *arrange* phase of a test (see *Anatomy of a test*). In pytest, they are functions you define that serve this purpose. They can also be used to define a test's *act* phase; this is a powerful technique for designing more complex tests.

The services, state, or other operating environments set up by fixtures are accessed by test functions through arguments. For each fixture used by a test function there is typically a parameter (named after the fixture) in the test function's definition.

We can tell pytest that a particular function is a fixture by decorating it with <code>@pytest.fixture</code>. Here's a simple example of what a fixture in pytest might look like:

```
import pytest

class Fruit:
    def __init__(self, name):
        self.name = name

    def __eq__(self, other):
        return self.name == other.name

@pytest.fixture
def my_fruit():
    return Fruit("apple")

@pytest.fixture
def fruit_basket(my_fruit):
    return [Fruit("banana"), my_fruit]

def test_my_fruit_in_basket(my_fruit, fruit_basket):
    assert my_fruit in fruit_basket
```

Tests don't have to be limited to a single fixture, either. They can depend on as many fixtures as you want, and fixtures can use other fixtures, as well. This is where pytest's fixture system really shines.

4.2.2 Improvements over xUnit-style setup/teardown functions

pytest fixtures offer dramatic improvements over the classic xUnit style of setup/teardown functions:

- fixtures have explicit names and are activated by declaring their use from test functions, modules, classes or whole projects.
- fixtures are implemented in a modular manner, as each fixture name triggers a fixture function which can itself use
 other fixtures.
- fixture management scales from simple unit to complex functional testing, allowing to parametrize fixtures and tests according to configuration and component options, or to reuse fixtures across function, class, module or whole test session scopes.
- teardown logic can be easily, and safely managed, no matter how many fixtures are used, without the need to carefully handle errors by hand or micromanage the order that cleanup steps are added.

In addition, pytest continues to support *How to implement xunit-style set-up*. You can mix both styles, moving incrementally from classic to new style, as you prefer. You can also start out from existing *unittest.TestCase style*.

4.2.3 Fixture errors

pytest does its best to put all the fixtures for a given test in a linear order so that it can see which fixture happens first, second, third, and so on. If an earlier fixture has a problem, though, and raises an exception, pytest will stop executing fixtures for that test and mark the test as having an error.

When a test is marked as having an error, it doesn't mean the test failed, though. It just means the test couldn't even be attempted because one of the things it depends on had a problem.

This is one reason why it's a good idea to cut out as many unnecessary dependencies as possible for a given test. That way a problem in something unrelated isn't causing us to have an incomplete picture of what may or may not have issues.

Here's a quick example to help explain:

```
import pytest

@pytest.fixture
def order():
    return []

@pytest.fixture
def append_first(order):
    order.append(1)

@pytest.fixture
def append_second(order, append_first):
    order.extend([2])

@pytest.fixture(autouse=True)
def append_third(order, append_second):
```

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```
order += [3]

def test_order(order):
    assert order == [1, 2, 3]
```

If, for whatever reason, order.append(1) had a bug and it raises an exception, we wouldn't be able to know if order.extend([2]) or order += [3] would also have problems. After append_first throws an exception, pytest won't run any more fixtures for test_order, and it won't even try to run test_order itself. The only things that would've run would be order and append_first.

4.2.4 Sharing test data

If you want to make test data from files available to your tests, a good way to do this is by loading these data in a fixture for use by your tests. This makes use of the automatic caching mechanisms of pytest.

Another good approach is by adding the data files in the tests folder. There are also community plugins available to help to manage this aspect of testing, e.g. pytest-datadir and pytest-datafiles.

4.2.5 A note about fixture cleanup

pytest does not do any special processing for SIGTERM and SIGQUIT signals (SIGINT is handled naturally by the Python runtime via KeyboardInterrupt), so fixtures that manage external resources which are important to be cleared when the Python process is terminated (by those signals) might leak resources.

The reason pytest does not handle those signals to perform fixture cleanup is that signal handlers are global, and changing them might interfere with the code under execution.

If fixtures in your suite need special care regarding termination in those scenarios, see this comment in the issue tracker for a possible workaround.

4.3 Good Integration Practices

4.3.1 Install package with pip

For development, we recommend you use <code>venv</code> for virtual environments and pip for installing your application and any dependencies, as well as the <code>pytest</code> package itself. This ensures your code and dependencies are isolated from your system Python installation.

Create a pyproject.toml file in the root of your repository as described in Packaging Python Projects. The first few lines should look like this:

```
[build-system]
requires = ["hatchling"]
build-backend = "hatchling.build"

[project]
name = "PACKAGENAME"
version = "PACKAGEVERSION"
```

where PACKAGENAME and PACKAGEVERSION are the name and version of your package respectively.

You can then install your package in "editable" mode by running from the same directory:

```
pip install -e .
```

which lets you change your source code (both tests and application) and rerun tests at will.

4.3.2 Conventions for Python test discovery

pytest implements the following standard test discovery:

- If no arguments are specified then collection starts from testpaths (if configured) or the current directory. Alternatively, command line arguments can be used in any combination of directories, file names or node ids.
- Recurse into directories, unless they match norecursedirs.
- In those directories, search for test_*.py or *_test.py files, imported by their *test package name*.
- From those files, collect test items:
 - test prefixed test functions or methods outside of class.
 - test prefixed test functions or methods inside Test prefixed test classes (without an __init__ method).
 Methods decorated with @staticmethod and @classmethods are also considered.

For examples of how to customize your test discovery Changing standard (Python) test discovery.

Within Python modules, pytest also discovers tests using the standard *unittest.TestCase* subclassing technique.

4.3.3 Choosing a test layout

pytest supports two common test layouts:

Tests outside application code

Putting tests into an extra directory outside your actual application code might be useful if you have many functional tests or for other reasons want to keep tests separate from actual application code (often a good idea):

```
pyproject.toml
src/
    mypkg/
    __init__.py
    app.py
    view.py

tests/
    test_app.py
    test_view.py
...
```

This has the following benefits:

- Your tests can run against an installed version after executing pip install ...
- Your tests can run against the local copy with an editable install after executing pip install --editable ...

For new projects, we recommend to use importlib *import mode* (see *which-import-mode* for a detailed explanation). To this end, add the following to your pyproject.toml:

```
[tool.pytest.ini_options]
addopts = [
   "--import-mode=importlib",
]
```

Generally, but especially if you use the default import mode prepend, it is **strongly** suggested to use a src layout. Here, your application root package resides in a sub-directory of your root, i.e. src/mypkg/ instead of mypkg.

This layout prevents a lot of common pitfalls and has many benefits, which are better explained in this excellent blog post by Ionel Cristian Mărieș.

1 Note

If you do not use an editable install and use the src layout as above you need to extend the Python's search path for module files to execute the tests against the local copy directly. You can do it in an ad-hoc manner by setting the PYTHONPATH environment variable:

```
PYTHONPATH=src pytest
```

or in a permanent manner by using the *pythonpath* configuration variable and adding the following to your pyproject.toml:

```
[tool.pytest.ini_options]
pythonpath = "src"
```

1 Note

If you do not use an editable install and not use the src layout (mypkg directly in the root directory) you can rely on the fact that Python by default puts the current directory in sys.path to import your package and run python -m pytest to execute the tests against the local copy directly.

See *Invoking pytest versus python -m pytest* for more information about the difference between calling pytest and python -m pytest.

Tests as part of application code

Inlining test directories into your application package is useful if you have direct relation between tests and application modules and want to distribute them along with your application:

```
pyproject.toml
[src/]mypkg/
    __init__.py
    app.py
    view.py
    tests/
    __init__.py
    test_app.py
    test_view.py
    ...
```

In this scheme, it is easy to run your tests using the --pyargs option:

```
pytest --pyargs mypkg
```

pytest will discover where mypkg is installed and collect tests from there.

Note that this layout also works in conjunction with the src layout mentioned in the previous section.



1 Note

You can use namespace packages (PEP420) for your application but pytest will still perform test package name discovery based on the presence of __init__.py files. If you use one of the two recommended file system layouts above but leave away the __init__.py files from your directories, it should just work. From "inlined tests", however, you will need to use absolute imports for getting at your application code.

Note

In prepend and append import-modes, if pytest finds a "a/b/test_module.py" test file while recursing into the filesystem it determines the import name as follows:

- determine basedir: this is the first "upward" (towards the root) directory not containing an __init__.py. If e.g. both a and b contain an __init__.py file then the parent directory of a will become the basedir.
- perform sys.path.insert(0, basedir) to make the test module importable under the fully qualified import name.
- import a.b.test_module where the path is determined by converting path separators / into "." characters. This means you must follow the convention of having directory and file names map directly to the import names.

The reason for this somewhat evolved importing technique is that in larger projects multiple test modules might import from each other and thus deriving a canonical import name helps to avoid surprises such as a test module getting imported twice.

With --import-mode=importlib things are less convoluted because pytest doesn't need to change sys.path or sys.modules, making things much less surprising.

Choosing an import mode

For historical reasons, pytest defaults to the prepend *import mode* instead of the importlib import mode we recommend for new projects. The reason lies in the way the prepend mode works:

Since there are no packages to derive a full package name from, pytest will import your test files as top-level modules. The test files in the first example (src layout) would be imported as test_app and test_view top-level modules by adding tests/to sys.path.

This results in a drawback compared to the import mode importlib: your test files must have **unique names**.

If you need to have test modules with the same name, as a workaround you might add __init__.py files to your tests folder and subfolders, changing them to packages:

```
pyproject.toml
mypkg/
tests/
    __init__.py
    foo/
         _init__.py
        test_view.py
```

```
bar/
__init__.py
test_view.py
```

Now pytest will load the modules as tests.foo.test_view and tests.bar.test_view, allowing you to have modules with the same name. But now this introduces a subtle problem: in order to load the test modules from the tests directory, pytest prepends the root of the repository to sys.path, which adds the side-effect that now mypkg is also importable.

This is problematic if you are using a tool like *tox* to test your package in a virtual environment, because you want to test the *installed* version of your package, not the local code from the repository.

The importlib import mode does not have any of the drawbacks above, because sys.path is not changed when importing test modules.

4.3.4 tox

Once you are done with your work and want to make sure that your actual package passes all tests you may want to look into tox, the virtualenv test automation tool. tox helps you to setup virtualenv environments with pre-defined dependencies and then executing a pre-configured test command with options. It will run tests against the installed package and not against your source code checkout, helping to detect packaging glitches.

4.3.5 Do not run via setuptools

Integration with setuptools is **not recommended**, i.e. you should not be using python setup.py test or pytest-runner, and may stop working in the future.

This is deprecated since it depends on deprecated features of setuptools and relies on features that break security mechanisms in pip. For example 'setup_requires' and 'tests_require' bypass pip --require-hashes. For more information and migration instructions, see the pytest-runner notice. See also pypa/setuptools#1684.

setuptools intends to remove the test command.

4.3.6 Checking with flake8-pytest-style

In order to ensure that pytest is being used correctly in your project, it can be helpful to use the flake8-pytest-style flake8 plugin.

flake8-pytest-style checks for common mistakes and coding style violations in pytest code, such as incorrect use of fixtures, test function names, and markers. By using this plugin, you can catch these errors early in the development process and ensure that your pytest code is consistent and easy to maintain.

A list of the lints detected by flake8-pytest-style can be found on its PyPI page.



flake8-pytest-style is not an official pytest project. Some of the rules enforce certain style choices, such as using <code>@pytest.fixture()</code> over <code>@pytest.fixture()</code> but you can configure the plugin to fit your preferred style.

4.4 Flaky tests

A "flaky" test is one that exhibits intermittent or sporadic failure, that seems to have non-deterministic behaviour. Sometimes it passes, sometimes it fails, and it's not clear why. This page discusses pytest features that can help and other general strategies for identifying, fixing or mitigating them.

4.4.1 Why flaky tests are a problem

Flaky tests are particularly troublesome when a continuous integration (CI) server is being used, so that all tests must pass before a new code change can be merged. If the test result is not a reliable signal – that a test failure means the code change broke the test – developers can become mistrustful of the test results, which can lead to overlooking genuine failures. It is also a source of wasted time as developers must re-run test suites and investigate spurious failures.

4.4.2 Potential root causes

System state

Broadly speaking, a flaky test indicates that the test relies on some system state that is not being appropriately controlled - the test environment is not sufficiently isolated. Higher level tests are more likely to be flaky as they rely on more state.

Flaky tests sometimes appear when a test suite is run in parallel (such as use of pytest-xdist). This can indicate a test is reliant on test ordering.

- Perhaps a different test is failing to clean up after itself and leaving behind data which causes the flaky test to fail.
- The flaky test is reliant on data from a previous test that doesn't clean up after itself, and in parallel runs that previous test is not always present
- Tests that modify global state typically cannot be run in parallel.

Overly strict assertion

Overly strict assertions can cause problems with floating point comparison as well as timing issues. pytest.approx() is useful here.

Thread safety

pytest is single-threaded, executing its tests always in the same thread, sequentially, never spawning any threads itself.

Even in case of plugins which run tests in parallel, for example pytest-xdist, usually work by spawning multiple *processes* and running tests in batches, without using multiple threads.

It is of course possible (and common) for tests and fixtures to spawn threads themselves as part of their testing workflow (for example, a fixture that starts a server thread in the background, or a test which executes production code that spawns threads), but some care must be taken:

- Make sure to eventually wait on any spawned threads for example at the end of a test, or during the teardown of a fixture.
- Avoid using primitives provided by pytest (pytest.warns(), pytest.raises(), etc) from multiple threads, as they are not thread-safe.

If your test suite uses threads and your are seeing flaky test results, do not discount the possibility that the test is implicitly using global state in pytest itself.

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4.4.3 Related features

Xfail strict

pytest.mark.xfail with strict=False can be used to mark a test so that its failure does not cause the whole build to break. This could be considered like a manual quarantine, and is rather dangerous to use permanently.

PYTEST_CURRENT_TEST

PYTEST_CURRENT_TEST may be useful for figuring out "which test got stuck". See PYTEST_CURRENT_TEST environment variable for more details.

Plugins

Rerunning any failed tests can mitigate the negative effects of flaky tests by giving them additional chances to pass, so that the overall build does not fail. Several pytest plugins support this:

- · pytest-rerunfailures
- pytest-replay: This plugin helps to reproduce locally crashes or flaky tests observed during CI runs.
- · pytest-flakefinder blog post

Plugins to deliberately randomize tests can help expose tests with state problems:

- · pytest-random-order
- pytest-randomly

4.4.4 Other general strategies

Split up test suites

It can be common to split a single test suite into two, such as unit vs integration, and only use the unit test suite as a CI gate. This also helps keep build times manageable as high level tests tend to be slower. However, it means it does become possible for code that breaks the build to be merged, so extra vigilance is needed for monitoring the integration test results.

Video/screenshot on failure

For UI tests these are important for understanding what the state of the UI was when the test failed. pytest-splinter can be used with plugins like pytest-bdd and can save a screenshot on test failure, which can help to isolate the cause.

Delete or rewrite the test

If the functionality is covered by other tests, perhaps the test can be removed. If not, perhaps it can be rewritten at a lower level which will remove the flakiness or make its source more apparent.

Quarantine

Mark Lapierre discusses the Pros and Cons of Quarantined Tests in a post from 2018.

CI tools that rerun on failure

Azure Pipelines (the Azure cloud CI/CD tool, formerly Visual Studio Team Services or VSTS) has a feature to identify flaky tests and rerun failed tests.

4.4.5 Research

This is a limited list, please submit an issue or pull request to expand it!

- Gao, Zebao, Yalan Liang, Myra B. Cohen, Atif M. Memon, and Zhen Wang. "Making system user interactive tests repeatable: When and what should we control?." In Software Engineering (ICSE), 2015 IEEE/ACM 37th IEEE International Conference on, vol. 1, pp. 55-65. IEEE, 2015. PDF
- Palomba, Fabio, and Andy Zaidman. "Does refactoring of test smells induce fixing flaky tests?." In Software
 Maintenance and Evolution (ICSME), 2017 IEEE International Conference on, pp. 1-12. IEEE, 2017. PDF in
 Google Drive
- Bell, Jonathan, Owolabi Legunsen, Michael Hilton, Lamyaa Eloussi, Tifany Yung, and Darko Marinov. "DeFlaker: Automatically detecting flaky tests." In *Proceedings of the 2018 International Conference on Software Engineering*. 2018. PDF
- Dutta, Saikat and Shi, August and Choudhary, Rutvik and Zhang, Zhekun and Jain, Aryaman and Misailovic, Sasa.
 "Detecting flaky tests in probabilistic and machine learning applications." In *Proceedings of the 29th ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA)*, pp. 211-224. ACM, 2020. PDF

4.4.6 Resources

- Eradicating Non-Determinism in Tests by Martin Fowler, 2011
- No more flaky tests on the Go team by Pavan Sudarshan, 2012
- The Build That Cried Broken: Building Trust in your Continuous Integration Tests talk (video) by Angie Jones at SeleniumConf Austin 2017
- Test and Code Podcast: Flaky Tests and How to Deal with Them by Brian Okken and Anthony Shaw, 2018
- · Microsoft:
 - How we approach testing VSTS to enable continuous delivery by Brian Harry MS, 2017
 - Eliminating Flaky Tests blog and talk (video) by Munil Shah, 2017
- Google:
 - Flaky Tests at Google and How We Mitigate Them by John Micco, 2016
 - Where do Google's flaky tests come from? by Jeff Listfield, 2017

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4.5 pytest import mechanisms and sys.path/PYTHONPATH

4.5.1 Import modes

pytest as a testing framework that needs to import test modules and conftest.py files for execution.

Importing files in Python is a non-trivial process, so aspects of the import process can be controlled through the --import-mode command-line flag, which can assume these values:

• prepend (default): The directory path containing each module will be inserted into the *beginning* of sys.path if not already there, and then imported with the importlib.import_module function.

It is highly recommended to arrange your test modules as packages by adding __init__.py files to your directories containing tests. This will make the tests part of a proper Python package, allowing pytest to resolve their full name (for example tests.core.test_core for test_core.py inside the tests.core package).

If the test directory tree is not arranged as packages, then each test file needs to have a unique name compared to the other test files, otherwise pytest will raise an error if it finds two tests with the same name.

This is the classic mechanism, dating back from the time Python 2 was still supported.

• append: the directory containing each module is appended to the end of sys.path if not already there, and imported with importlib.import_module.

This better allows users to run test modules against installed versions of a package even if the package under test has the same import root. For example:

```
testing/__init__.py
testing/test_pkg_under_test.py
pkg_under_test/
```

the tests will run against the installed version of pkg_under_test when --import-mode=append is used whereas with prepend, they would pick up the local version. This kind of confusion is why we advocate for using src-layouts.

Same as prepend, requires test module names to be unique when the test directory tree is not arranged in packages, because the modules will put in sys.modules after importing.

• importlib: this mode uses more fine control mechanisms provided by importlib to import test modules, without changing sys.path.

Advantages of this mode:

- pytest will not change sys.path at all.
- Test module names do not need to be unique pytest will generate a unique name automatically based on the rootdir.

Disadvantages:

- Test modules can't import each other.
- Testing utility modules in the tests directories (for example a tests.helpers module containing test-related functions/classes) are not importable. The recommendation in this case it to place testing utility modules together with the application/library code, for example app.testing.helpers.

Important: by "test utility modules", we mean functions/classes which are imported by other tests directly; this does not include fixtures, which should be placed in conftest.py files, along with the test modules, and are discovered automatically by pytest.

It works like this:

1. Given a certain module path, for example tests/core/test_models.py, derives a canonical name like tests.core.test_models and tries to import it.

For non-test modules, this will work if they are accessible via sys.path. So for example, .env/lib/site-packages/app/core.py will be importable as app.core. This is happens when plugins import non-test modules (for example doctesting).

If this step succeeds, the module is returned.

For test modules, unless they are reachable from sys.path, this step will fail.

2. If the previous step fails, we import the module directly using importlib facilities, which lets us import it without changing sys.path.

Because Python requires the module to also be available in sys.modules, pytest derives a unique name for it based on its relative location from the rootdir, and adds the module to sys.modules.

For example, tests/core/test_models.py will end up being imported as the module tests. core.test_models.

Added in version 6.0.

1 Note

Initially we intended to make importlib the default in future releases, however it is clear now that it has its own set of drawbacks so the default will remain prepend for the foreseeable future.

1 Note

By default, pytest will not attempt to resolve namespace packages automatically, but that can be changed via the <code>consider_namespace_packages</code> configuration variable.

See also

The pythonpath configuration variable.

The consider_namespace_packages configuration variable.

Choosing a test layout.

4.5.2 prepend and append import modes scenarios

Here's a list of scenarios when using prepend or append import modes where pytest needs to change sys.path in order to import test modules or confitest.py files, and the issues users might encounter because of that.

Test modules / conftest.py files inside packages

Consider this file and directory layout:

```
root/
|- foo/
|- foo/
|- __init__.py
|- conftest.py
|- bar/
|- __init__.py
|- tests/
|- __init__.py
|- test_foo.py
```

When executing:

```
pytest root/
```

pytest will find foo/bar/tests/test_foo.py and realize it is part of a package given that there's an __init__. py file in the same folder. It will then search upwards until it can find the last folder which still contains an __init__. py file in order to find the package *root* (in this case foo/). To load the module, it will insert root/ to the front of sys.path (if not there already) in order to load test_foo.py as the *module* foo.bar.tests.test_foo.

The same logic applies to the conftest.py file: it will be imported as foo.conftest module.

Preserving the full package name is important when tests live in a package to avoid problems and allow test modules to have duplicated names. This is also discussed in details in *Conventions for Python test discovery*.

Standalone test modules / conftest.py files

Consider this file and directory layout:

```
root/
|- foo/
|- conftest.py
|- bar/
|- tests/
|- test_foo.py
```

When executing:

```
pytest root/
```

pytest will find foo/bar/tests/test_foo.py and realize it is NOT part of a package given that there's no __init__.py file in the same folder. It will then add root/foo/bar/tests to sys.path in order to import test_foo.py as the *module* test_foo. The same is done with the conftest.py file by adding root/foo to sys.path to import it as conftest.

For this reason this layout cannot have test modules with the same name, as they all will be imported in the global import namespace.

This is also discussed in details in *Conventions for Python test discovery*.

4.5.3 Invoking pytest versus python -m pytest

Running pytest with pytest [...] instead of python -m pytest [...] yields nearly equivalent behaviour, except that the latter will add the current directory to sys.path, which is standard python behavior.

See also Calling pytest through python -m pytest.

CHAPTER

FIVE

FURTHER TOPICS

5.1 Examples and customization tricks

Here is a (growing) list of examples. *Contact* us if you need more examples or have questions. Also take a look at the *comprehensive documentation* which contains many example snippets as well. Also, pytest on stackoverflow.com often comes with example answers.

For basic examples, see

- Get Started for basic introductory examples
- How to write and report assertions in tests for basic assertion examples
- *Fixtures* for basic fixture/setup examples
- How to parametrize fixtures and test functions for basic test function parametrization
- How to use unittest-based tests with pytest for basic unittest integration

The following examples aim at various use cases you might encounter.

5.1.1 Demo of Python failure reports with pytest

Here is a nice run of several failures and how pytest presents things:

```
self = <failure_demo.TestFailing object at 0xdeadbeef0001>
   def test_simple(self):
       def f():
           return 42
       def g():
           return 43
       assert f() == g()
       assert 42 == 43
        + where 42 = <function TestFailing.test_simple.<locals>.f at 0xdeadbeef0002>
→ ()
       + and 43 = <function TestFailing.test_simple.<locals>.g at 0xdeadbeef0003>
→ ()
failure_demo.py:32: AssertionError
           _____ TestFailing.test_simple_multiline ____
self = <failure_demo.TestFailing object at 0xdeadbeef0004>
   def test_simple_multiline(self):
     otherfunc_multi(42, 6 * 9)
failure_demo.py:35:
a = 42, b = 54
   def otherfunc_multi(a, b):
      assert a == b
       assert 42 == 54
failure_demo.py:16: AssertionError
                  ______ TestFailing.test_not _
self = <failure_demo.TestFailing object at 0xdeadbeef0005>
   def test_not(self):
       def f():
          return 42
       assert not f()
       assert not 42
        + where 42 = <function TestFailing.test_not.<locals>.f at 0xdeadbeef0006>()
failure_demo.py:41: AssertionError
        _____ TestSpecialisedExplanations.test_eq_text ____
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef0007>
   def test_eq_text(self):
       assert "spam" == "eggs"
       AssertionError: assert 'spam' == 'eggs'
Ε
Ε
Ε
       - eggs
```

Chapter 5. Further topics

```
+ spam
failure_demo.py:46: AssertionError
         ____ TestSpecialisedExplanations.test_eq_similar_text _
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef0008>
   def test_eq_similar_text(self):
       assert "foo 1 bar" == "foo 2 bar"
\mathbf{E}
       AssertionError: assert 'foo 1 bar' == 'foo 2 bar'
\mathbf{E}
E
         - foo 2 bar
         ? ^
         + foo 1 bar
failure_demo.py:49: AssertionError
      _____ TestSpecialisedExplanations.test_eq_multiline_text ___
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef0009>
   def test_eq_multiline_text(self):
       assert "foo\nspam\nbar" == "foo\neggs\nbar"
Ε
       AssertionError: assert 'foo\nspam\nbar' == 'foo\neggs\nbar'
E
E
           foo
Ε
         - eggs
E
         + spam
Ε
           bar
failure_demo.py:52: AssertionError
        ______ TestSpecialisedExplanations.test_eq_long_text _
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef000a>
   def test_eq_long_text(self):
       a = "1" * 100 + "a" + "2" * 100
       b = "1" * 100 + "b" + "2" * 100
       assert a == b
       AssertionError: assert '1111111111111...222222222222 == '1111111111111...
→222222222222'
Ε
         Skipping 90 identical leading characters in diff, use -v to show
Ε
\mathbf{E}
         Skipping 91 identical trailing characters in diff, use -v to show
         - 1111111111b22222222
Ε
                 ^
Ε
Ε
          + 1111111111a22222222
failure_demo.py:57: AssertionError
      ___ TestSpecialisedExplanations.test_eq_long_text_multiline __
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef000b>
   def test_eq_long_text_multiline(self):
       a = "1\n" * 100 + "a" + "2\n" * 100
        b = "1\n" * 100 + "b" + "2\n" * 100
```

```
assert a == b
        AssertionError: assert 1 n1 n1 n1 n...n2 n2 n2 n' == 1 n1 n1 n1 n...n2
\rightarrown2\n2\n2\n'
\mathbf{E}
\mathbf{E}
          Skipping 190 identical leading characters in diff, use -v to show
Ε
          Skipping 191 identical trailing characters in diff, use -v to show
Ε
            1
Ε
            1
Ε
            1
\mathbf{E}
            1...
\mathbf{E}
          ... Full output truncated (7 lines hidden), use '-vv' to show
failure_demo.py:62: AssertionError
           _____ TestSpecialisedExplanations.test_eq_list _
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef000c>
    def test_eq_list(self):
        assert [0, 1, 2] == [0, 1, 3]
        assert [0, 1, 2] == [0, 1, 3]
Ε
Ε
          At index 2 diff: 2 != 3
\mathbf{E}
          Use -v to get more diff
failure_demo.py:65: AssertionError
          _____ TestSpecialisedExplanations.test_eq_list_long _
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef000d>
    def test_eq_list_long(self):
        a = [0] * 100 + [1] + [3] * 100
        b = [0] * 100 + [2] + [3] * 100
        assert a == b
        assert [0, 0, 0, 0, 0, 0, \ldots] == [0, 0, 0, 0, 0, 0, \ldots]
Ε
Ε
          At index 100 diff: 1 != 2
\mathbf{E}
         Use -v to get more diff
failure_demo.py:70: AssertionError
             _____ TestSpecialisedExplanations.test_eq_dict _
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef000e>
    def test_eq_dict(self):
        assert {"a": 0, "b": 1, "c": 0} == {"a": 0, "b": 2, "d": 0}
        AssertionError: assert {'a': 0, 'b': 1, 'c': 0} == {'a': 0, 'b': 2, 'd': 0}
Ε
Ε
          Omitting 1 identical items, use -vv to show
          Differing items:
\mathbf{E}
E
          {'b': 1} != {'b': 2}
Ε
          Left contains 1 more item:
Ε
         {'c': 0}
Ε
         Right contains 1 more item:
Ε
          {'d': 0}
Ε
         Use -v to get more diff
```

```
failure_demo.py:73: AssertionError
            _____ TestSpecialisedExplanations.test_eq_set _
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef000f>
   def test_eq_set(self):
       assert \{0, 10, 11, 12\} == \{0, 20, 21\}
\mathbf{E}
       assert \{0, 10, 11, 12\} == \{0, 20, 21\}
Ε
\mathbf{E}
        Extra items in the left set:
\mathbf{E}
         10
E
         11
Ε
         12
        Extra items in the right set:
Ε
         21
Ε
         Use -v to get more diff
failure_demo.py:76: AssertionError
     self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef0010>
   def test_eq_longer_list(self):
       assert [1, 2] == [1, 2, 3]
\mathbf{E}
       assert [1, 2] == [1, 2, 3]
Ε
        Right contains one more item: 3
         Use -v to get more diff
failure_demo.py:79: AssertionError
        ______ TestSpecialisedExplanations.test_in_list __
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef0011>
   def test_in_list(self):
      assert 1 in [0, 2, 3, 4, 5]
       assert 1 in [0, 2, 3, 4, 5]
failure_demo.py:82: AssertionError
  TestSpecialisedExplanations.test_not_in_text_multiline
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef0012>
   def test_not_in_text_multiline(self):
       text = "some multiline\ntext\nwhich\nincludes foo\nand a\ntail"
       assert "foo" not in text
       AssertionError: assert 'foo' not in 'some multil...nand a\ntail'
Ε
E
         'foo' is contained here:
E
           some multiline
Ε
           text
Ε
           which
Ε
           includes foo
Ε
                  +++
Ε
           and a
Ε
           t.ail
```

```
failure_demo.py:86: AssertionError
      ____ TestSpecialisedExplanations.test_not_in_text_single _
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef0013>
   def test_not_in_text_single(self):
      text = "single foo line"
      assert "foo" not in text
\mathbf{E}
      AssertionError: assert 'foo' not in 'single foo line'
\mathbf{E}
E
       'foo' is contained here:
        single foo line
              +++
failure_demo.py:90: AssertionError
    _____ TestSpecialisedExplanations.test_not_in_text_single_long _
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef0014>
   def test_not_in_text_single_long(self):
      text = "head " * 50 + "foo " + "tail " * 20
      assert "foo" not in text
E
      AssertionError: assert 'foo' not in 'head head h...l tail tail '
E
E
       'foo' is contained here:
        →tail tail tail tail tail tail tail
       ?
                 +++
failure_demo.py:94: AssertionError
    _ TestSpecialisedExplanations.test_not_in_text_single_long_term _
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef0015>
   def test_not_in_text_single_long_term(self):
      text = "head " * 50 + "f" * 70 + "tail " * 20
      assert "f" * 70 not in text
     AssertionError: assert 'fffffffffffffffffffffffffff not in 'head head h...l_
⇔tail tail '
       'fffffffffffffffff...ffffffffffffffff' is contained here:
        head head_
failure_demo.py:98: AssertionError
     _____ TestSpecialisedExplanations.test_eq_dataclass __
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef0016>
   def test eq dataclass(self):
      from dataclasses import dataclass
```

```
@dataclass
        class Foo:
           a: int
           b: str
        left = Foo(1, "b")
        right = Foo(1, "c")
        assert left == right
        AssertionError: assert TestSpecialis...oo(a=1, b='b') == TestSpecialis...
→oo(a=1, b='c')
E
Ε
         Omitting 1 identical items, use -vv to show
Ε
         Differing attributes:
Ε
         ['b']
Ε
Ε
         Drill down into differing attribute b:
           b: 'b' != 'c'
Ε
           - c
E
            + b
failure_demo.py:110: AssertionError
       ______ TestSpecialisedExplanations.test_eq_attrs ___
self = <failure_demo.TestSpecialisedExplanations object at 0xdeadbeef0017>
   def test_eq_attrs(self):
       import attr
        @attr.s
        class Foo:
           a = attr.ib()
           b = attr.ib()
        left = Foo(1, "b")
        right = Foo(1, "c")
        assert left == right
Ε
       AssertionError: assert Foo(a=1, b='b') == Foo(a=1, b='c')
Ε
Ε
         Omitting 1 identical items, use -vv to show
Ε
         Differing attributes:
Ε
         ['b']
Ε
Ε
         Drill down into differing attribute b:
           b: 'b' != 'c'
E
           - C
Ε
            + b
failure_demo.py:122: AssertionError
                        _____ test_attribute __
   def test_attribute():
        class Foo:
           b = 1
        i = Foo()
        assert i.b == 2
Ε
        assert 1 == 2
```

```
+ where 1 = <failure_demo.test_attribute.<locals>.Foo object at_
\rightarrow 0xdeadbeef0018>.b
failure_demo.py:130: AssertionError
                     ____ test_attribute_instance _
   def test_attribute_instance():
       class Foo:
           b = 1
       assert Foo().b == 2
       AssertionError: assert 1 == 2
        + where 1 = <failure_demo.test_attribute_instance.<locals>.Foo object at_
\hookrightarrow 0xdeadbeef0019>.b
     + where <failure_demo.test_attribute_instance.<locals>.Foo object at_
→0xdeadbeef0019> = <class 'failure_demo.test_attribute_instance.<locals>.Foo'>()
failure_demo.py:137: AssertionError
                   _____ test_attribute_failure __
   def test_attribute_failure():
       class Foo:
           def _get_b(self):
                raise Exception("Failed to get attrib")
           b = property(_get_b)
       i = Foo()
       assert i.b == 2
failure_demo.py:148:
self = <failure_demo.test_attribute_failure.<locals>.Foo object at 0xdeadbeef001a>
   def _get_b(self):
      raise Exception("Failed to get attrib")
       Exception: Failed to get attrib
failure_demo.py:143: Exception
                  _____ test_attribute_multiple _
   def test_attribute_multiple():
       class Foo:
           b = 1
       class Bar:
           b = 2
       assert Foo().b == Bar().b
       AssertionError: assert 1 == 2
        + where 1 = <failure_demo.test_attribute_multiple.<locals>.Foo object at_
→0xdeadbeef001b>.b
       + where <failure_demo.test_attribute_multiple.<locals>.Foo object at_
→0xdeadbeef001b> = <class 'failure demo.test attribute multiple.<locals>.Foo'>()
    + and 2 = <failure_demo.test_attribute_multiple.<locals>.Bar object at_
\hookrightarrow 0xdeadbeef001c>.b
```

```
E + where <failure_demo.test_attribute_multiple.<locals>.Bar object at_
\rightarrow0xdeadbeef001c> = <class 'failure_demo.test_attribute_multiple.<locals>.Bar'>()
failure_demo.py:158: AssertionError
             ______ TestRaises.test_raises _
self = <failure_demo.TestRaises object at 0xdeadbeef001d>
   def test_raises(self):
      s = "qwe"
       raises(TypeError, int, s)
       ValueError: invalid literal for int() with base 10: 'qwe'
failure_demo.py:168: ValueError
            ______ TestRaises.test_raises_doesnt _
self = <failure_demo.TestRaises object at 0xdeadbeef001e>
   def test_raises_doesnt(self):
       raises (OSError, int, "3")
       Failed: DID NOT RAISE <class 'OSError'>
failure_demo.py:171: Failed
   _____ TestRaises.test_raise ____
self = <failure_demo.TestRaises object at 0xdeadbeef001f>
  def test_raise(self):
       raise ValueError("demo error")
       ValueError: demo error
failure_demo.py:174: ValueError
                    ____ TestRaises.test_tupleerror _
self = <failure_demo.TestRaises object at 0xdeadbeef0020>
   def test_tupleerror(self):
     a, b = [1] # noqa: F841
       ValueError: not enough values to unpack (expected 2, got 1)
failure_demo.py:177: ValueError
  ____ TestRaises.test_reinterpret_fails_with_print_for_the_fun_of_it ___
self = <failure_demo.TestRaises object at 0xdeadbeef0021>
   def test_reinterpret_fails_with_print_for_the_fun_of_it(self):
       items = [1, 2, 3]
       print(f"items is {items!r}")
       a, b = items.pop()
       TypeError: cannot unpack non-iterable int object
failure_demo.py:182: TypeError
----- Captured stdout call ------
items is [1, 2, 3]
                      _ TestRaises.test_some_error _
self = <failure_demo.TestRaises object at 0xdeadbeef0022>
                                                                      (continues on next page)
```

```
def test_some_error(self):
       if namenotexi: # noqa: F821
Ε
       NameError: name 'namenotexi' is not defined
failure_demo.py:185: NameError
                  __ test_dynamic_compile_shows_nicely __
   def test_dynamic_compile_shows_nicely():
       import importlib.util
       import sys
       src = "def foo():\n assert 1 == 0\n"
       name = "abc-123"
       spec = importlib.util.spec_from_loader(name, loader=None)
       module = importlib.util.module_from_spec(spec)
       code = compile(src, name, "exec")
       exec(code, module.__dict__)
       sys.modules[name] = module
       module.foo()
failure_demo.py:204:
  ???
E AssertionError
abc-123:2: AssertionError
               _____ TestMoreErrors.test_complex_error _
self = <failure_demo.TestMoreErrors object at 0xdeadbeef0023>
   def test_complex_error(self):
       def f():
           return 44
       def g():
          return 43
       somefunc(f(), g())
failure_demo.py:215:
failure_demo.py:12: in somefunc
   otherfunc(x, y)
a = 44, b = 43
   def otherfunc(a, b):
    assert a == b
      assert 44 == 43
failure_demo.py:8: AssertionError
                 ___ TestMoreErrors.test_z1_unpack_error _
self = <failure_demo.TestMoreErrors object at 0xdeadbeef0024>
                                                                         (continues on next page)
```

```
def test_z1_unpack_error(self):
       items = []
       a, b = items
       ValueError: not enough values to unpack (expected 2, got 0)
failure_demo.py:219: ValueError
              _____ TestMoreErrors.test_z2_type_error _
self = <failure_demo.TestMoreErrors object at 0xdeadbeef0025>
   def test_z2_type_error(self):
      items = 3
       a, b = items
       TypeError: cannot unpack non-iterable int object
failure_demo.py:223: TypeError
           _____ TestMoreErrors.test_startswith ____
self = <failure_demo.TestMoreErrors object at 0xdeadbeef0026>
   def test startswith(self):
       s = "123"
       g = "456"
      assert s.startswith(g)
      AssertionError: assert False
        + where False = <built-in method startswith of str object at 0xdeadbeef0027>
('456')
            where <built-in method startswith of str object at 0xdeadbeef0027> =
→'123'.startswith
failure_demo.py:228: AssertionError
             _____ TestMoreErrors.test_startswith_nested __
self = <failure_demo.TestMoreErrors object at 0xdeadbeef0028>
   def test_startswith_nested(self):
      def f():
          return "123"
       def q():
          return "456"
       assert f().startswith(g())
       AssertionError: assert False
       + where False = <built-in method startswith of str object at 0xdeadbeef0027>
            where <built-in method startswith of str object at 0xdeadbeef0027> =
→'123'.startswith
       +
              where '123' = <function TestMoreErrors.test_startswith_nested.<locals>
→ .f at 0xdeadbeef0029>()
    + and '456' = <function TestMoreErrors.test_startswith_nested.<locals>.
\rightarrowg at 0xdeadbeef002a>()
failure_demo.py:237: AssertionError
                    _ TestMoreErrors.test_global_func _
```

```
self = <failure_demo.TestMoreErrors object at 0xdeadbeef002b>
   def test_global_func(self):
       assert isinstance(globf(42), float)
       assert False
        + where False = isinstance(43, float)
            where 43 = globf(42)
failure_demo.py:240: AssertionError
                 _____ TestMoreErrors.test_instance _
self = <failure_demo.TestMoreErrors object at 0xdeadbeef002c>
   def test_instance(self):
       self.x = 6 * 7
       assert self.x != 42
       assert 42 != 42
E
        + where 42 = <failure_demo.TestMoreErrors object at 0xdeadbeef002c>.x
failure_demo.py:244: AssertionError
              ______ TestMoreErrors.test_compare __
self = <failure_demo.TestMoreErrors object at 0xdeadbeef002d>
   def test_compare(self):
      assert globf(10) < 5
       assert 11 < 5
        + where 11 = globf(10)
failure_demo.py:247: AssertionError
                  ____ TestMoreErrors.test_try_finally _
self = <failure_demo.TestMoreErrors object at 0xdeadbeef002e>
   def test_try_finally(self):
       x = 1
      try:
           assert x == 0
Ε
           assert 1 == 0
failure_demo.py:252: AssertionError
            ______ TestCustomAssertMsg.test_single_line __
self = <failure_demo.TestCustomAssertMsg object at 0xdeadbeef002f>
   def test_single_line(self):
       class A:
           a = 1
       assert A.a == b, "A.a appears not to be b"
       AssertionError: A.a appears not to be b
       assert 1 == 2
        + where 1 = <class 'failure_demo.TestCustomAssertMsg.test_single_line.

<locals>.A'>.a
failure_demo.py:263: AssertionError
                                                                         (continues on next page)
```

```
TestCustomAssertMsg.test_multiline
self = <failure_demo.TestCustomAssertMsq object at 0xdeadbeef0030>
   def test_multiline(self):
       class A:
           a = 1
       b = 2
       assert (
          A.a == b
       ), "A.a appears not to be b\nor does not appear to be b\none of those"
       AssertionError: A.a appears not to be b
         or does not appear to be b
         one of those
       assert 1 == 2
        + where 1 = <class 'failure_demo.TestCustomAssertMsg.test_multiline.<locals>
→.A'>.a
failure_demo.py:270: AssertionError
            _____ TestCustomAssertMsg.test_custom_repr _
self = <failure_demo.TestCustomAssertMsq object at 0xdeadbeef0031>
   def test_custom_repr(self):
       class JSON:
           a = 1
           def __repr__(self):
               return "This is JSON\n{\n 'foo': 'bar'\n}"
       a = JSON()
       b = 2
       assert a.a == b, a
       AssertionError: This is JSON
Ε
Ε
\mathbf{E}
           'foo': 'bar'
\mathbf{E}
         }
Ε
       assert 1 == 2
        + where 1 = This is JSON\n{\n 'foo': 'bar'\n}.a
failure_demo.py:283: AssertionError
FAILED failure_demo.py::test_generative[3-6] - assert (3 * 2) < 6
FAILED failure_demo.py::TestFailing::test_simple - assert 42 == 43
FAILED failure_demo.py::TestFailing::test_simple_multiline - assert 42 == 54
FAILED failure_demo.py::TestFailing::test_not - assert not 42
FAILED failure_demo.py::TestSpecialisedExplanations::test_eq_text - Asser...
FAILED failure_demo.py::TestSpecialisedExplanations::test_eq_similar_text
FAILED failure_demo.py::TestSpecialisedExplanations::test_eq_multiline_text
FAILED failure_demo.py::TestSpecialisedExplanations::test_eq_long_text - ...
FAILED failure_demo.py::TestSpecialisedExplanations::test_eq_long_text_multiline
FAILED failure_demo.py::TestSpecialisedExplanations::test_eq_list - asser...
FAILED failure_demo.py::TestSpecialisedExplanations::test_eq_list_long - ...
FAILED failure_demo.py::TestSpecialisedExplanations::test_eq_dict - Asser...
FAILED failure_demo.py::TestSpecialisedExplanations::test_eq_set - assert...
FAILED failure_demo.py::TestSpecialisedExplanations::test_eq_longer_list
                                                                       (continues on next page)
```

```
FAILED failure_demo.py::TestSpecialisedExplanations::test_in_list - asser...
FAILED failure_demo.py::TestSpecialisedExplanations::test_not_in_text_multiline
FAILED failure_demo.py::TestSpecialisedExplanations::test_not_in_text_single
FAILED failure_demo.py::TestSpecialisedExplanations::test_not_in_text_single_long
FAILED failure_demo.py::TestSpecialisedExplanations::test_not_in_text_single_long_term
FAILED failure_demo.py::TestSpecialisedExplanations::test_eq_dataclass - ...
FAILED failure_demo.py::TestSpecialisedExplanations::test_eq_attrs - Asse...
FAILED failure_demo.py::test_attribute - assert 1 == 2
FAILED failure_demo.py::test_attribute_instance - AssertionError: assert ...
FAILED failure_demo.py::test_attribute_failure - Exception: Failed to get...
FAILED failure_demo.py::test_attribute_multiple - AssertionError: assert ...
FAILED failure_demo.py::TestRaises::test_raises - ValueError: invalid lit...
FAILED failure_demo.py::TestRaises::test_raises_doesnt - Failed: DID NOT ...
FAILED failure_demo.py::TestRaises::test_raise - ValueError: demo error
FAILED failure_demo.py::TestRaises::test_tupleerror - ValueError: not eno...
FAILED failure_demo.py::TestRaises::test_reinterpret_fails_with_print_for_the_fun_of_
FAILED failure_demo.py::TestRaises::test_some_error - NameError: name 'na...
FAILED failure_demo.py::test_dynamic_compile_shows_nicely - AssertionError
FAILED failure_demo.py::TestMoreErrors::test_complex_error - assert 44 == 43
FAILED failure_demo.py::TestMoreErrors::test_z1_unpack_error - ValueError...
FAILED failure_demo.py::TestMoreErrors::test_z2_type_error - TypeError: c...
FAILED failure_demo.py::TestMoreErrors::test_startswith - AssertionError:...
FAILED failure_demo.py::TestMoreErrors::test_startswith_nested - Assertio...
FAILED failure_demo.py::TestMoreErrors::test_global_func - assert False
FAILED failure_demo.py::TestMoreErrors::test_instance - assert 42 != 42
FAILED failure_demo.py::TestMoreErrors::test_compare - assert 11 < 5
FAILED failure_demo.py::TestMoreErrors::test_try_finally - assert 1 == 0
FAILED failure_demo.py::TestCustomAssertMsq::test_single_line - Assertion...
FAILED failure_demo.py::TestCustomAssertMsg::test_multiline - AssertionEr...
FAILED failure_demo.py::TestCustomAssertMsg::test_custom_repr - Assertion...
```

5.1.2 Basic patterns and examples

How to change command line options defaults

It can be tedious to type the same series of command line options every time you use pytest. For example, if you always want to see detailed info on skipped and xfailed tests, as well as have terser "dot" progress output, you can write it into a configuration file:

```
# content of pytest.ini
[pytest]
addopts = -ra -q
```

Alternatively, you can set a PYTEST_ADDOPTS environment variable to add command line options while the environment is in use:

```
export PYTEST_ADDOPTS="-v"
```

Here's how the command-line is built in the presence of addopts or the environment variable:

```
<pytest.ini:addopts> $PYTEST_ADDOPTS <extra command-line arguments>
```

So if the user executes in the command-line:

```
pytest -m slow
```

The actual command line executed is:

```
pytest -ra -q -v -m slow
```

Note that as usual for other command-line applications, in case of conflicting options the last one wins, so the example above will show verbose output because -v overwrites -q.

Pass different values to a test function, depending on command line options

Suppose we want to write a test that depends on a command line option. Here is a basic pattern to achieve this:

```
# content of test_sample.py
def test_answer(cmdopt):
    if cmdopt == "type1":
        print("first")
    elif cmdopt == "type2":
        print("second")
    assert 0 # to see what was printed
```

For this to work we need to add a command line option and provide the cmdopt through a fixture function:

```
# content of conftest.py
import pytest

def pytest_addoption(parser):
    parser.addoption(
        "--cmdopt", action="store", default="type1", help="my option: type1 or type2"
    )

@pytest.fixture
def cmdopt(request):
    return request.config.getoption("--cmdopt")
```

Let's run this without supplying our new option:

And now with supplying a command line option:

```
$ pytest -q --cmdopt=type2
F
                                                     [100%]
_____ test_answer _
cmdopt = 'type2'
  def test_answer(cmdopt):
      if cmdopt == "type1":
        print("first")
      elif cmdopt == "type2":
        print("second")
      assert 0 # to see what was printed
Ε
     assert 0
test_sample.py:6: AssertionError
------ Captured stdout call -------
========== short test summary info ==========================
FAILED test_sample.py::test_answer - assert 0
1 failed in 0.12s
```

You can see that the command line option arrived in our test.

We could add simple validation for the input by listing the choices:

```
# content of conftest.py
import pytest

def pytest_addoption(parser):
    parser.addoption(
        "--cmdopt",
        action="store",
        default="type1",
        help="my option: type1 or type2",
        choices=("type1", "type2"),
    )
```

Now we'll get feedback on a bad argument:

```
$ pytest -q --cmdopt=type3
ERROR: usage: pytest [options] [file_or_dir] [file_or_dir] [...]
pytest: error: argument --cmdopt: invalid choice: 'type3' (choose from 'type1', 'type2
--')
```

If you need to provide more detailed error messages, you can use the type parameter and raise pytest. UsageError:

```
# content of conftest.py
import pytest
(continues on next page)
```

```
def type_checker(value):
    msg = "cmdopt must specify a numeric type as typeNNN"
    if not value.startswith("type"):
        raise pytest. UsageError (msg)
   try:
        int(value[4:])
    except ValueError:
        raise pytest.UsageError(msg)
    return value
def pytest_addoption(parser):
   parser.addoption(
        "--cmdopt",
        action="store",
        default="type1",
        help="my option: type1 or type2",
        type=type_checker,
    )
```

This completes the basic pattern. However, one often rather wants to process command line options outside of the test and rather pass in different or more complex objects.

Dynamically adding command line options

Through addopts you can statically add command line options for your project. You can also dynamically modify the command line arguments before they get processed:

```
# installable external plugin
import sys

def pytest_load_initial_conftests(args):
    if "xdist" in sys.modules: # pytest-xdist plugin
        import multiprocessing

    num = max(multiprocessing.cpu_count() / 2, 1)
    args[:] = ["-n", str(num)] + args
```

If you have the xdist plugin installed you will now always perform test runs using a number of subprocesses close to your CPU. Running in an empty directory with the above conftest.py:

Control skipping of tests according to command line option

Here is a conftest.py file adding a --runslow command line option to control skipping of pytest.mark. slow marked tests:

We can now write a test module like this:

```
# content of test_module.py
import pytest

def test_func_fast():
    pass

@pytest.mark.slow
def test_func_slow():
    pass
```

and when running it will see a skipped "slow" test:

Or run it including the slow marked test:

Writing well integrated assertion helpers

If you have a test helper function called from a test you can use the pytest.fail marker to fail a test with a certain message. The test support function will not show up in the traceback if you set the __tracebackhide__ option somewhere in the helper function. Example:

```
# content of test_checkconfig.py
import pytest

def checkconfig(x):
    __tracebackhide__ = True
    if not hasattr(x, "config"):
        pytest.fail(f"not configured: {x}")

def test_something():
    checkconfig(42)
```

The __tracebackhide__ setting influences pytest showing of tracebacks: the checkconfig function will not be shown unless the --full-trace command line option is specified. Let's run our little function:

If you only want to hide certain exceptions, you can set __tracebackhide__ to a callable which gets the ExceptionInfo object. You can for example use this to make sure unexpected exception types aren't hidden:

```
def checkconfig(x):
    __tracebackhide__ = operator.methodcaller("errisinstance", ConfigException)
    if not hasattr(x, "config"):
        raise ConfigException(f"not configured: {x}")

def test_something():
    checkconfig(42)
```

This will avoid hiding the exception traceback on unrelated exceptions (i.e. bugs in assertion helpers).

Detect if running from within a pytest run

Usually it is a bad idea to make application code behave differently if called from a test. But if you absolutely must find out if your application code is running from a test you can do this:

```
import os

if os.environ.get("PYTEST_VERSION") is not None:
    # Things you want to to do if your code is called by pytest.
    ...
else:
    # Things you want to to do if your code is not called by pytest.
    ...
```

Adding info to test report header

It's easy to present extra information in a pytest run:

```
# content of conftest.py

def pytest_report_header(config):
    return "project deps: mylib-1.1"
```

which will add the string to the test header accordingly:

It is also possible to return a list of strings which will be considered as several lines of information. You may consider config.getoption('verbose') in order to display more information if applicable:

```
# content of conftest.py

def pytest_report_header(config):
    if config.get_verbosity() > 0:
        return ["info1: did you know that ...", "did you?"]
```

which will add info only when run with "-v":

and nothing when run plainly:

Profiling test duration

If you have a slow running large test suite you might want to find out which tests are the slowest. Let's make an artificial test suite:

```
# content of test_some_are_slow.py
import time

def test_funcfast():
    time.sleep(0.1)

def test_funcslow1():
    time.sleep(0.2)

def test_funcslow2():
    time.sleep(0.3)
```

Now we can profile which test functions execute the slowest:

Incremental testing - test steps

Sometimes you may have a testing situation which consists of a series of test steps. If one step fails it makes no sense to execute further steps as they are all expected to fail anyway and their tracebacks add no insight. Here is a simple confitest.py file which introduces an incremental marker which is to be used on classes:

```
# content of conftest.py
from typing import Dict, Tuple
import pytest
# store history of failures per test class name and per index in parametrize (ifu
→parametrize used)
_test_failed_incremental: Dict[str, Dict[Tuple[int, ...], str]] = {}
def pytest_runtest_makereport(item, call):
   if "incremental" in item.keywords:
        # incremental marker is used
        if call.excinfo is not None:
            # the test has failed
            # retrieve the class name of the test
           cls_name = str(item.cls)
            # retrieve the index of the test (if parametrize is used in combination...
→with incremental)
           parametrize_index = (
                tuple(item.callspec.indices.values())
                if hasattr(item, "callspec")
                else ()
            )
            # retrieve the name of the test function
            test_name = item.originalname or item.name
            # store in _test_failed_incremental the original name of the failed test
            _test_failed_incremental.setdefault(cls_name, {}).setdefault(
                parametrize_index, test_name
def pytest_runtest_setup(item):
    if "incremental" in item.keywords:
        # retrieve the class name of the test
       cls_name = str(item.cls)
        # check if a previous test has failed for this class
```

These two hook implementations work together to abort incremental-marked tests in a class. Here is a test module example:

```
# content of test_step.py
import pytest

@pytest.mark.incremental
class TestUserHandling:
    def test_login(self):
        pass

    def test_modification(self):
        assert 0

    def test_deletion(self):
        pass

def test_normal():
    pass
```

If we run this:

```
assert 0
test_step.py:11: AssertionError
============= short test summary info =================
XFAIL test_step.py::TestUserHandling::test_deletion - reason: previous test failed_
→ (test_modification)
========= 1 failed, 2 passed, 1 xfailed in 0.12s ============
```

We'll see that test_deletion was not executed because test_modification failed. It is reported as an "expected failure".

Package/Directory-level fixtures (setups)

If you have nested test directories, you can have per-directory fixture scopes by placing fixture functions in a conftest. py file in that directory. You can use all types of fixtures including autouse fixtures which are the equivalent of xUnit's setup/teardown concept. It's however recommended to have explicit fixture references in your tests or test classes rather than relying on implicitly executing setup/teardown functions, especially if they are far away from the actual tests.

Here is an example for making a db fixture available in a directory:

```
# content of a/conftest.py
import pytest
class DB:
   pass
@pytest.fixture(scope="package")
def db():
   return DB()
```

and then a test module in that directory:

```
# content of a/test_db.py
def test_a1(db):
   assert 0, db # to show value
```

another test module:

```
# content of a/test_db2.py
def test_a2(db):
   assert 0, db # to show value
```

and then a module in a sister directory which will not see the db fixture:

```
# content of b/test_error.py
def test_root(db): # no db here, will error out
   pass
```

We can run this:

```
$ pytest
platform linux -- Python 3.x.y, pytest-8.x.y, pluggy-1.x.y
```

```
rootdir: /home/sweet/project
collected 7 items
a/test_db.py F
                                                              [ 14%]
a/test_db2.py F
                                                              [ 28%]
b/test_error.py E
                                                              [ 42%]
test_step.py .Fx.
                                                              [100%]
____ ERROR at setup of test_root ___
file /home/sweet/project/b/test_error.py, line 1
 def test_root(db): # no db here, will error out
     fixture 'db' not found
     available fixtures: cache, capfd, capfdbinary, caplog, capsys, capsysbinary,
→doctest_namespace, monkeypatch, pytestconfig, record_property, record_testsuite_
→property, record_xml_attribute, recwarn, tmp_path, tmp_path_factory, tmpdir, tmpdir_
→factory
      use 'pytest --fixtures [testpath]' for help on them.
/home/sweet/project/b/test_error.py:1
___ test_a1 __
db = <conftest.DB object at 0xdeadbeef0002>
   def test_a1(db):
      assert 0, db # to show value
      AssertionError: <conftest.DB object at 0xdeadbeef0002>
      assert 0
a/test_db.py:2: AssertionError
                            __ test_a2 _
db = <conftest.DB object at 0xdeadbeef0002>
  def test_a2(db):
      assert 0, db # to show value
      AssertionError: <conftest.DB object at 0xdeadbeef0002>
      assert 0
a/test_db2.py:2: AssertionError
          _____ TestUserHandling.test_modification _
self = <test_step.TestUserHandling object at 0xdeadbeef0003>
   def test_modification(self):
     assert 0
      assert 0
test_step.py:11: AssertionError
========== short test summary info ==========================
FAILED a/test_db.py::test_a1 - AssertionError: <conftest.DB object at 0x7...
FAILED a/test_db2.py::test_a2 - AssertionError: <conftest.DB object at 0x...
FAILED test_step.py::TestUserHandling::test_modification - assert 0
ERROR b/test_error.py::test_root
====== 3 failed, 2 passed, 1 xfailed, 1 error in 0.12s ========
```

The two test modules in the a directory see the same db fixture instance while the one test in the sister-directory b doesn't see it. We could of course also define a db fixture in that sister directory's conftest.py file. Note that each fixture is only instantiated if there is a test actually needing it (unless you use "autouse" fixture which are always executed ahead of the first test executing).

Post-process test reports / failures

If you want to postprocess test reports and need access to the executing environment you can implement a hook that gets called when the test "report" object is about to be created. Here we write out all failing test calls and also access a fixture (if it was used by the test) in case you want to query/look at it during your post processing. In our case we just write some information out to a failures file:

```
# content of conftest.py
import os.path
import pytest
@pytest.hookimpl(wrapper=True, tryfirst=True)
def pytest_runtest_makereport(item, call):
    # execute all other hooks to obtain the report object
   rep = yield
    # we only look at actual failing test calls, not setup/teardown
   if rep.when == "call" and rep.failed:
       mode = "a" if os.path.exists("failures") else "w"
        with open("failures", mode, encoding="utf-8") as f:
            # let's also access a fixture for the fun of it
            if "tmp_path" in item.fixturenames:
                extra = " ({})".format(item.funcargs["tmp_path"])
            else:
                extra = ""
            f.write(rep.nodeid + extra + "\n")
    return rep
```

if you then have failing tests:

```
# content of test_module.py
def test_fail1(tmp_path):
    assert 0

def test_fail2():
    assert 0
```

and run them:

```
test_module.py FF
                                                 [100%]
_ test_fail1
tmp_path = PosixPath('PYTEST_TMPDIR/test_fail10')
  def test_fail1(tmp_path):
    assert 0
Ε
     assert 0
test_module.py:2: AssertionError
                  _____ test_fail2 _
  def test_fail2():
    assert 0
Ε
     assert 0
test_module.py:6: AssertionError
============ short test summary info ========================
FAILED test_module.py::test_fail1 - assert 0
FAILED test_module.py::test_fail2 - assert 0
```

you will have a "failures" file which contains the failing test ids:

```
$ cat failures
test_module.py::test_fail1 (PYTEST_TMPDIR/test_fail10)
test_module.py::test_fail2
```

Making test result information available in fixtures

If you want to make test result reports available in fixture finalizers here is a little example implemented via a local plugin:

```
# content of conftest.py
from typing import Dict
import pytest
from pytest import StashKey, CollectReport

phase_report_key = StashKey[Dict[str, CollectReport]]()

@pytest.hookimpl(wrapper=True, tryfirst=True)
def pytest_runtest_makereport(item, call):
    # execute all other hooks to obtain the report object
    rep = yield

# store test results for each phase of a call, which can
    # be "setup", "call", "teardown"
    item.stash.setdefault(phase_report_key, {})[rep.when] = rep

    return rep

@pytest.fixture
```

```
def something(request):
    yield
    # request.node is an "item" because we use the default
    # "function" scope
    report = request.node.stash[phase_report_key]
    if report["setup"].failed:
        print("setting up a test failed or skipped", request.node.nodeid)
    elif ("call" not in report) or report["call"].failed:
        print("executing test failed or skipped", request.node.nodeid)
```

if you then have failing tests:

```
# content of test_module.py
import pytest

@pytest.fixture
def other():
    assert 0

def test_setup_fails(something, other):
    pass

def test_call_fails(something):
    assert 0

def test_fail2():
    assert 0
```

and run it:

```
$ pytest -s test_module.py
platform linux -- Python 3.x.y, pytest-8.x.y, pluggy-1.x.y
rootdir: /home/sweet/project
collected 3 items
test_module.py Esetting up a test failed or skipped test_module.py::test_setup_fails
Fexecuting test failed or skipped test_module.py::test_call_fails
___ ERROR at setup of test_setup_fails __
  @pytest.fixture
  def other():
   assert 0
>
Ε
    assert 0
test_module.py:7: AssertionError
_ test_call_fails _
```

```
something = None
   def test_call_fails(something):
      assert 0
\mathbf{E}
      assert 0
test_module.py:15: AssertionError
                           _ test_fail2 _
   def test_fail2():
      assert 0
\mathbf{E}
      assert 0
test_module.py:19: AssertionError
========== short test summary info ==========================
FAILED test_module.py::test_call_fails - assert 0
FAILED test_module.py::test_fail2 - assert 0
ERROR test_module.py::test_setup_fails - assert 0
```

You'll see that the fixture finalizers could use the precise reporting information.

PYTEST_CURRENT_TEST environment variable

Sometimes a test session might get stuck and there might be no easy way to figure out which test got stuck, for example if pytest was run in quiet mode (-q) or you don't have access to the console output. This is particularly a problem if the problem happens only sporadically, the famous "flaky" kind of tests.

pytest sets the PYTEST_CURRENT_TEST environment variable when running tests, which can be inspected by process monitoring utilities or libraries like psutil to discover which test got stuck if necessary:

```
import psutil

for pid in psutil.pids():
    environ = psutil.Process(pid).environ()
    if "PYTEST_CURRENT_TEST" in environ:
        print(f'pytest process {pid} running: {environ["PYTEST_CURRENT_TEST"]}')
```

During the test session pytest will set PYTEST_CURRENT_TEST to the current test *nodeid* and the current stage, which can be setup, call, or teardown.

For example, when running a single test function named test_foo from foo_module.py, PYTEST_CUR-RENT_TEST will be set to:

```
    foo_module.py::test_foo (setup)
    foo_module.py::test_foo (call)
    foo_module.py::test_foo (teardown)
```

In that order.



The contents of PYTEST_CURRENT_TEST is meant to be human readable and the actual format can be changed between releases (even bug fixes) so it shouldn't be relied on for scripting or automation.

Freezing pytest

If you freeze your application using a tool like PyInstaller in order to distribute it to your end-users, it is a good idea to also package your test runner and run your tests using the frozen application. This way packaging errors such as dependencies not being included into the executable can be detected early while also allowing you to send test files to users so they can run them in their machines, which can be useful to obtain more information about a hard to reproduce bug.

Fortunately recent PyInstaller releases already have a custom hook for pytest, but if you are using another tool to freeze executables such as <code>cx_freeze</code> or <code>py2exe</code>, you can use <code>pytest.freeze_includes()</code> to obtain the full list of internal pytest modules. How to configure the tools to find the internal modules varies from tool to tool, however.

Instead of freezing the pytest runner as a separate executable, you can make your frozen program work as the pytest runner by some clever argument handling during program startup. This allows you to have a single executable, which is usually more convenient. Please note that the mechanism for plugin discovery used by pytest (*entry points*) doesn't work with frozen executables so pytest can't find any third party plugins automatically. To include third party plugins like pytest-timeout they must be imported explicitly and passed on to pytest.main.

```
# contents of app_main.py
import sys

import pytest_timeout # Third party plugin

if len(sys.argv) > 1 and sys.argv[1] == "--pytest":
    import pytest

    sys.exit(pytest.main(sys.argv[2:], plugins=[pytest_timeout]))
else:
    # normal application execution: at this point argv can be parsed
    # by your argument-parsing library of choice as usual
    ...
```

This allows you to execute tests using the frozen application with standard pytest command-line options:

```
./app_main --pytest --verbose --tb=long --junit=xml=results.xml test-suite/
```

5.1.3 Parametrizing tests

pytest allows to easily parametrize test functions. For basic docs, see *How to parametrize fixtures and test functions*. In the following we provide some examples using the builtin mechanisms.

Generating parameters combinations, depending on command line

Let's say we want to execute a test with different computation parameters and the parameter range shall be determined by a command line argument. Let's first write a simple (do-nothing) computation test:

```
# content of test_compute.py

def test_compute(param1):
    assert param1 < 4</pre>
```

Now we add a test configuration like this:

```
# content of conftest.py

def pytest_addoption(parser):
    parser.addoption("--all", action="store_true", help="run all combinations")

def pytest_generate_tests(metafunc):
    if "param1" in metafunc.fixturenames:
        if metafunc.config.getoption("all"):
            end = 5
    else:
        end = 2
    metafunc.parametrize("param1", range(end))
```

This means that we only run 2 tests if we do not pass --all:

```
$ pytest -q test_compute.py
..
2 passed in 0.12s
[100%]
```

We run only two computations, so we see two dots. let's run the full monty:

As expected when running the full range of param1 values we'll get an error on the last one.

Different options for test IDs

pytest will build a string that is the test ID for each set of values in a parametrized test. These IDs can be used with -k to select specific cases to run, and they will also identify the specific case when one is failing. Running pytest with -collect-only will show the generated IDs.

Numbers, strings, booleans and None will have their usual string representation used in the test ID. For other objects, pytest will make a string based on the argument name:

```
# content of test_time.py
from datetime import datetime, timedelta
import pytest
```

```
testdata = [
    (datetime(2001, 12, 12), datetime(2001, 12, 11), timedelta(1)),
    (datetime(2001, 12, 11), datetime(2001, 12, 12), timedelta(-1)),
@pytest.mark.parametrize("a, b, expected", testdata)
def test_timedistance_v0(a, b, expected):
   diff = a - b
    assert diff == expected
@pytest.mark.parametrize("a,b,expected", testdata, ids=["forward", "backward"])
def test_timedistance_v1(a, b, expected):
   diff = a - b
    assert diff == expected
def idfn(val):
    if isinstance(val, (datetime,)):
        # note this wouldn't show any hours/minutes/seconds
        return val.strftime("%Y%m%d")
@pytest.mark.parametrize("a,b,expected", testdata, ids=idfn)
def test_timedistance_v2(a, b, expected):
   diff = a - b
    assert diff == expected
@pytest.mark.parametrize(
    "a, b, expected",
        pytest.param(
           datetime(2001, 12, 12), datetime(2001, 12, 11), timedelta(1), id="forward"
        ),
        pytest.param(
            datetime(2001, 12, 11), datetime(2001, 12, 12), timedelta(-1), id=
→ "backward"
       ),
   1,
def test_timedistance_v3(a, b, expected):
   diff = a - b
    assert diff == expected
```

In test_timedistance_v0, we let pytest generate the test IDs.

In test_timedistance_v1, we specified ids as a list of strings which were used as the test IDs. These are succinct, but can be a pain to maintain.

In test_timedistance_v2, we specified ids as a function that can generate a string representation to make part of the test ID. So our datetime values use the label generated by idfn, but because we didn't generate a label for timedelta objects, they are still using the default pytest representation:

In test_timedistance_v3, we used pytest.param to specify the test IDs together with the actual data, instead of listing them separately.

A quick port of "testscenarios"

Here is a quick port to run tests configured with testscenarios, an add-on from Robert Collins for the standard unittest framework. We only have to work a bit to construct the correct arguments for pytest's <code>Metafunc.parametrize</code>:

```
# content of test_scenarios.py
def pytest_generate_tests(metafunc):
    idlist = []
    argvalues = []
    for scenario in metafunc.cls.scenarios:
        idlist.append(scenario[0])
        items = scenario[1].items()
        argnames = [x[0] for x in items]
        argvalues.append([x[1] for x in items])
   metafunc.parametrize(argnames, argvalues, ids=idlist, scope="class")
scenario1 = ("basic", {"attribute": "value"})
scenario2 = ("advanced", {"attribute": "value2"})
class TestSampleWithScenarios:
    scenarios = [scenario1, scenario2]
    def test_demo1(self, attribute):
        assert isinstance(attribute, str)
    def test_demo2(self, attribute):
        assert isinstance(attribute, str)
```

this is a fully self-contained example which you can run with:

If you just collect tests you'll also nicely see 'advanced' and 'basic' as variants for the test function:

Note that we told metafunc.parametrize() that your scenario values should be considered class-scoped. With pytest-2.3 this leads to a resource-based ordering.

Deferring the setup of parametrized resources

The parametrization of test functions happens at collection time. It is a good idea to setup expensive resources like DB connections or subprocess only when the actual test is run. Here is a simple example how you can achieve that. This test requires a db object fixture:

```
# content of test_backends.py
import pytest

def test_db_initialized(db):
    # a dummy test
    if db.__class__.__name__ == "DB2":
        pytest.fail("deliberately failing for demo purposes")
```

We can now add a test configuration that generates two invocations of the test_db_initialized function and also implements a factory that creates a database object for the actual test invocations:

```
metafunc.parametrize("db", ["d1", "d2"], indirect=True)

class DB1:
    "one database object"

class DB2:
    "alternative database object"

@pytest.fixture
def db(request):
    if request.param == "d1":
        return DB1()
    elif request.param == "d2":
        return DB2()
    else:
        raise ValueError("invalid internal test config")
```

Let's first see how it looks like at collection time:

And then when we run the test:

The first invocation with db == "DB1" passed while the second with db == "DB2" failed. Our db fixture function has instantiated each of the DB values during the setup phase while the pytest_generate_tests generated two

according calls to the test_db_initialized during the collection phase.

Indirect parametrization

Using the indirect=True parameter when parametrizing a test allows to parametrize a test with a fixture receiving the values before passing them to a test:

```
import pytest

@pytest.fixture
def fixt(request):
    return request.param * 3

@pytest.mark.parametrize("fixt", ["a", "b"], indirect=True)
def test_indirect(fixt):
    assert len(fixt) == 3
```

This can be used, for example, to do more expensive setup at test run time in the fixture, rather than having to run those setup steps at collection time.

Apply indirect on particular arguments

Very often parametrization uses more than one argument name. There is opportunity to apply indirect parameter on particular arguments. It can be done by passing list or tuple of arguments' names to indirect. In the example below there is a function test_indirect which uses two fixtures: x and y. Here we give to indirect the list, which contains the name of the fixture x. The indirect parameter will be applied to this argument only, and the value a will be passed to respective fixture function:

```
# content of test_indirect_list.py
import pytest

@pytest.fixture(scope="function")
def x(request):
    return request.param * 3

@pytest.fixture(scope="function")
def y(request):
    return request.param * 2

@pytest.mark.parametrize("x, y", [("a", "b")], indirect=["x"])
def test_indirect(x, y):
    assert x == "aaa"
    assert y == "b"
```

The result of this test will be successful:

Parametrizing test methods through per-class configuration

Here is an example pytest_generate_tests function implementing a parametrization scheme similar to Michael Foord's unittest parametrizer but in a lot less code:

```
# content of ./test_parametrize.py
import pytest
def pytest_generate_tests(metafunc):
   # called once per each test function
   funcarglist = metafunc.cls.params[metafunc.function.__name__]
   argnames = sorted(funcarglist[0])
   metafunc.parametrize(
       argnames, [[funcargs[name] for name in argnames] for funcargs in funcarglist]
class TestClass:
    # a map specifying multiple argument sets for a test method
   params = {
        "test_equals": [dict(a=1, b=2), dict(a=3, b=3)],
        "test_zerodivision": [dict(a=1, b=0)],
    }
   def test_equals(self, a, b):
       assert a == b
   def test_zerodivision(self, a, b):
        with pytest.raises(ZeroDivisionError):
```

Our test generator looks up a class-level definition which specifies which argument sets to use for each test function. Let's run it:

Parametrization with multiple fixtures

Here is a stripped down real-life example of using parametrized testing for testing serialization of objects between different python interpreters. We define a test_basic_objects function which is to be run with different sets of arguments for its three arguments:

- python1: first python interpreter, run to pickle-dump an object to a file
- python2: second interpreter, run to pickle-load an object from a file
- obj: object to be dumped/loaded

```
"""Module containing a parametrized tests testing cross-python serialization
via the pickle module."""
from __future__ import annotations
import shutil
import subprocess
import textwrap
import pytest
pythonlist = ["python3.9", "python3.10", "python3.11"]
@pytest.fixture(params=pythonlist)
def python1(request, tmp_path):
   picklefile = tmp_path / "data.pickle"
   return Python(request.param, picklefile)
@pytest.fixture(params=pythonlist)
def python2(request, python1):
   return Python(request.param, python1.picklefile)
class Python:
   def __init__(self, version, picklefile):
       self.pythonpath = shutil.which(version)
        if not self.pythonpath:
            pytest.skip(f"{version!r} not found")
        self.picklefile = picklefile
    def dumps(self, obj):
        dumpfile = self.picklefile.with_name("dump.py")
        dumpfile.write_text(
            textwrap.dedent(
                import pickle
```

```
f = open({str(self.picklefile)!r}, 'wb')
                s = pickle.dump({obj!r}, f, protocol=2)
                f.close()
            )
        subprocess.run((self.pythonpath, str(dumpfile)), check=True)
    def load_and_is_true(self, expression):
        loadfile = self.picklefile.with_name("load.py")
        loadfile.write_text(
            textwrap.dedent(
                rf"""
                import pickle
                f = open({str(self.picklefile)!r}, 'rb')
                obj = pickle.load(f)
                f.close()
                res = eval({expression!r})
                if not res:
                   raise SystemExit(1)
            )
        )
        print (loadfile)
        subprocess.run((self.pythonpath, str(loadfile)), check=True)
@pytest.mark.parametrize("obj", [42, {}, {1: 3}])
def test_basic_objects(python1, python2, obj):
   python1.dumps(obj)
    python2.load_and_is_true(f"obj == {obj}")
```

Running it results in some skips if we don't have all the python interpreters installed and otherwise runs all combinations (3 interpreters times 3 objects to serialize/deserialize):

Parametrization of optional implementations/imports

If you want to compare the outcomes of several implementations of a given API, you can write test functions that receive the already imported implementations and get skipped in case the implementation is not importable/available. Let's say we have a "base" implementation and the other (possibly optimized ones) need to provide similar results:

```
# content of conftest.py
import pytest

@pytest.fixture(scope="session")
def basemod(request):
```

```
return pytest.importorskip("base")

@pytest.fixture(scope="session", params=["opt1", "opt2"])
def optmod(request):
    return pytest.importorskip(request.param)
```

And then a base implementation of a simple function:

```
# content of base.py
def func1():
    return 1
```

And an optimized version:

```
# content of opt1.py
def func1():
    return 1.0001
```

And finally a little test module:

```
# content of test_module.py

def test_func1(basemod, optmod):
    assert round(basemod.func1(), 3) == round(optmod.func1(), 3)
```

If you run this with reporting for skips enabled:

You'll see that we don't have an opt2 module and thus the second test run of our test_func1 was skipped. A few notes:

- the fixture functions in the conftest.py file are "session-scoped" because we don't need to import more than once
- if you have multiple test functions and a skipped import, you will see the [1] count increasing in the report
- you can put @pytest.mark.parametrize style parametrization on the test functions to parametrize input/output values
 as well.

Set marks or test ID for individual parametrized test

Use pytest.param to apply marks or set test ID to individual parametrized test. For example:

In this example, we have 4 parametrized tests. Except for the first test, we mark the rest three parametrized tests with the custom marker basic, and for the fourth test we also use the built-in mark xfail to indicate this test is expected to fail. For explicitness, we set test ids for some tests.

Then run pytest with verbose mode and with only the basic marker:

As the result:

- Four tests were collected
- One test was deselected because it doesn't have the basic mark.
- Three tests with the basic mark was selected.
- The test test_eval[1+7-8] passed, but the name is autogenerated and confusing.
- The test test_eval[basic_2+4] passed.
- The test test_eval[basic_6*9] was expected to fail and did fail.

Parametrizing conditional raising

Use pytest.raises() with the pytest.mark.parametrize decorator to write parametrized tests in which some tests raise exceptions and others do not.

contextlib.nullcontext can be used to test cases that are not expected to raise exceptions but that should result in some value. The value is given as the enter_result parameter, which will be available as the with statement's target (e in the example below).

For example:

```
from contextlib import nullcontext
import pytest

@pytest.mark.parametrize(
    "example_input, expectation",
    [
        (3, nullcontext(2)),
        (2, nullcontext(3)),
        (1, nullcontext(6)),
        (0, pytest.raises(ZeroDivisionError)),
    ],
)
def test_division(example_input, expectation):
    """Test how much I know division."""
    with expectation as e:
        assert (6 / example_input) == e
```

In the example above, the first three test cases should run without any exceptions, while the fourth should raise a Zero-DivisionError exception, which is expected by pytest.

5.1.4 Working with custom markers

Here are some examples using the *How to mark test functions with attributes* mechanism.

Marking test functions and selecting them for a run

You can "mark" a test function with custom metadata like this:

```
# content of test_server.py
import pytest

@pytest.mark.webtest
def test_send_http():
    pass # perform some webtest test for your app

@pytest.mark.device(serial="123")
def test_something_quick():
    pass
```

```
@pytest.mark.device(serial="abc")
def test_another():
    pass

class TestClass:
    def test_method(self):
        pass
```

You can then restrict a test run to only run tests marked with webtest:

Or the inverse, running all tests except the webtest ones:

Additionally, you can restrict a test run to only run tests matching one or multiple marker keyword arguments, e.g. to run only tests marked with device and the specific serial="123":



Only keyword argument matching is supported in marker expressions.

1 Note

Only int, (unescaped) str, bool & None values are supported in marker expressions.

Selecting tests based on their node ID

You can provide one or more *node IDs* as positional arguments to select only specified tests. This makes it easy to select tests based on their module, class, method, or function name:

You can also select on the class:

Or select multiple nodes:

1 Note

Node IDs are of the form module.py::class::method or module.py::function. Node IDs control which tests are collected, so module.py::class will select all test methods on the class. Nodes are also created for each parameter of a parametrized fixture or test, so selecting a parametrized test must include the parameter value, e.g. module.py::function[param].

Node IDs for failing tests are displayed in the test summary info when running pytest with the -rf option. You can also construct Node IDs from the output of pytest --collect-only.

Using -k expr to select tests based on their name

Added in version 2.0/2.3.4.

You can use the -k command line option to specify an expression which implements a substring match on the test names instead of the exact match on markers that -m provides. This makes it easy to select tests based on their names:

Changed in version 5.4.

The expression matching is now case-insensitive.

And you can also run all tests except the ones that match the keyword:

Or to select "http" and "quick" tests:

You can use and, or, not and parentheses.

In addition to the test's name, -k also matches the names of the test's parents (usually, the name of the file and class it's in), attributes set on the test function, markers applied to it or its parents and any extra keywords explicitly added to it or its parents.

Registering markers

Registering markers for your test suite is simple:

```
# content of pytest.ini
[pytest]
markers =
    webtest: mark a test as a webtest.
    slow: mark test as slow.
```

Multiple custom markers can be registered, by defining each one in its own line, as shown in above example.

You can ask which markers exist for your test suite - the list includes our just defined webtest and slow markers:

```
$ pytest --markers
@pytest.mark.webtest: mark a test as a webtest.
@pytest.mark.slow: mark test as slow.
@pytest.mark.filterwarnings(warning): add a warning filter to the given test. see_
→https://docs.pytest.org/en/stable/how-to/capture-warnings.html#pytest-mark-
→filterwarnings
@pytest.mark.skip(reason=None): skip the given test function with an optional reason.__
→Example: skip(reason="no way of currently testing this") skips the test.
@pytest.mark.skipif(condition, ..., *, reason=...): skip the given test function if_
→any of the conditions evaluate to True. Example: skipif(sys.platform == 'win32') __
→skips the test if we are on the win32 platform. See https://docs.pytest.org/en/
→stable/reference/reference.html#pytest-mark-skipif
@pytest.mark.xfail(condition, ..., *, reason=..., run=True, raises=None, strict=xfail_
→strict): mark the test function as an expected failure if any of the conditions_
\rightarrowevaluate to True. Optionally specify a reason for better reporting and run=False if
\rightarrowyou don't even want to execute the test function. If only specific exception(s) are
→expected, you can list them in raises, and if the test fails in other ways, it will_
→be reported as a true failure. See https://docs.pytest.org/en/stable/reference/
→reference.html#pytest-mark-xfail
@pytest.mark.parametrize(argnames, argvalues): call a test function multiple times_
→passing in different arguments in turn. argvalues generally needs to be a list of_
\rightarrowvalues if argnames specifies only one name or a list of tuples of values if
```

```
→argnames specifies multiple names. Example: @parametrize('arg1', [1,2]) would lead.

→to two calls of the decorated test function, one with arg1=1 and another with.

→arg1=2.see https://docs.pytest.org/en/stable/how-to/parametrize.html for more info.

→and examples.

@pytest.mark.usefixtures(fixturename1, fixturename2, ...): mark tests as needing all.

→of the specified fixtures. see https://docs.pytest.org/en/stable/explanation/

→fixtures.html#usefixtures

@pytest.mark.tryfirst: mark a hook implementation function such that the plugin.

→machinery will try to call it first/as early as possible. DEPRECATED, use @pytest.

→hookimpl(tryfirst=True) instead.

@pytest.mark.trylast: mark a hook implementation function such that the plugin.

→machinery will try to call it last/as late as possible. DEPRECATED, use @pytest.

→hookimpl(trylast=True) instead.
```

For an example on how to add and work with markers from a plugin, see *Custom marker and command line option to control test runs*.

1 Note

It is recommended to explicitly register markers so that:

- There is one place in your test suite defining your markers
- Asking for existing markers via pytest --markers gives good output
- Typos in function markers are treated as an error if you use the --strict-markers option.

Marking whole classes or modules

You may use pytest.mark decorators with classes to apply markers to all of its test methods:

```
# content of test_mark_classlevel.py
import pytest

@pytest.mark.webtest
class TestClass:
    def test_startup(self):
        pass

def test_startup_and_more(self):
        pass
```

This is equivalent to directly applying the decorator to the two test functions.

To apply marks at the module level, use the pytestmark global variable:

```
import pytest
pytestmark = pytest.mark.webtest
```

or multiple markers:

```
pytestmark = [pytest.mark.webtest, pytest.mark.slowtest]
```

Due to legacy reasons, before class decorators were introduced, it is possible to set the pytestmark attribute on a test class like this:

```
class TestClass:
    pytestmark = pytest.mark.webtest
```

Marking individual tests when using parametrize

When using parametrize, applying a mark will make it apply to each individual test. However it is also possible to apply a marker to an individual test instance:

```
import pytest

@pytest.mark.foo
@pytest.mark.parametrize(
    ("n", "expected"), [(1, 2), pytest.param(1, 3, marks=pytest.mark.bar), (2, 3)]
)
def test_increment(n, expected):
    assert n + 1 == expected
```

In this example the mark "foo" will apply to each of the three tests, whereas the "bar" mark is only applied to the second test. Skip and xfail marks can also be applied in this way, see *Skip/xfail with parametrize*.

Custom marker and command line option to control test runs

Plugins can provide custom markers and implement specific behaviour based on it. This is a self-contained example which adds a command line option and a parametrized test function marker to run tests specified via named environments:

```
# content of conftest.py
import pytest

def pytest_addoption(parser):
    parser.addoption(
        "-E",
        action="store",
        metavar="NAME",
        help="only run tests matching the environment NAME.",
)

def pytest_configure(config):
    # register an additional marker
    config.addinivalue_line(
        "markers", "env(name): mark test to run only on named environment"
)
```

```
def pytest_runtest_setup(item):
    envnames = [mark.args[0] for mark in item.iter_markers(name="env")]
    if envnames:
        if item.config.getoption("-E") not in envnames:
            pytest.skip(f"test requires env in {envnames!r}")
```

A test file using this local plugin:

```
# content of test_someenv.py
import pytest

@pytest.mark.env("stage1")
def test_basic_db_operation():
    pass
```

and an example invocations specifying a different environment than what the test needs:

and here is one that specifies exactly the environment needed:

The --markers option always gives you a list of available markers:

```
⇒stable/reference/reference.html#pytest-mark-skipif
@pytest.mark.xfail(condition, ..., *, reason=..., run=True, raises=None, strict=xfail_
→strict): mark the test function as an expected failure if any of the conditions_
\hookrightarrowevaluate to True. Optionally specify a reason for better reporting and run=False if
\rightarrowyou don't even want to execute the test function. If only specific exception(s) are
→expected, you can list them in raises, and if the test fails in other ways, it will_
→be reported as a true failure. See https://docs.pytest.org/en/stable/reference/
→reference.html#pytest-mark-xfail
@pytest.mark.parametrize(argnames, argvalues): call a test function multiple times_
→passing in different arguments in turn. argvalues generally needs to be a list of
→values if argnames specifies only one name or a list of tuples of values if_
→argnames specifies multiple names. Example: @parametrize('arg1', [1,2]) would lead_
→to two calls of the decorated test function, one with arg1=1 and another with
→arg1=2.see https://docs.pytest.org/en/stable/how-to/parametrize.html for more info_
\rightarrowand examples.
@pytest.mark.usefixtures(fixturename1, fixturename2, ...): mark tests as needing all_
→of the specified fixtures. see https://docs.pytest.org/en/stable/explanation/
→fixtures.html#usefixtures
@pytest.mark.tryfirst: mark a hook implementation function such that the plugin_
→machinery will try to call it first/as early as possible. DEPRECATED, use @pytest.
→hookimpl(tryfirst=True) instead.
@pytest.mark.trylast: mark a hook implementation function such that the plugin-
→machinery will try to call it last/as late as possible. DEPRECATED, use @pytest.
→hookimpl(trylast=True) instead.
```

Passing a callable to custom markers

Below is the config file that will be used in the next examples:

```
# content of conftest.py
import sys

def pytest_runtest_setup(item):
    for marker in item.iter_markers(name="my_marker"):
        print(marker)
        sys.stdout.flush()
```

A custom marker can have its argument set, i.e. args and kwargs properties, defined by either invoking it as a callable or using pytest.mark.MARKER_NAME.with_args. These two methods achieve the same effect most of the time.

However, if there is a callable as the single positional argument with no keyword arguments, using the pytest.mark. MARKER_NAME(c) will not pass c as a positional argument but decorate c with the custom marker (see *MarkDecorator*). Fortunately, pytest.mark.MARKER_NAME.with_args comes to the rescue:

```
# content of test_custom_marker.py
import pytest

def hello_world(*args, **kwargs):
```

```
return "Hello World"

@pytest.mark.my_marker.with_args(hello_world)
def test_with_args():
    pass
```

The output is as follows:

```
$ pytest -q -s
Mark(name='my_marker', args=(<function hello_world at 0xdeadbeef0001>,), kwargs={})
.
1 passed in 0.12s
```

We can see that the custom marker has its argument set extended with the function hello_world. This is the key difference between creating a custom marker as a callable, which invokes __call__ behind the scenes, and using with_args.

Reading markers which were set from multiple places

If you are heavily using markers in your test suite you may encounter the case where a marker is applied several times to a test function. From plugin code you can read over all such settings. Example:

```
# content of test_mark_three_times.py
import pytest

pytestmark = pytest.mark.glob("module", x=1)

@pytest.mark.glob("class", x=2)
class TestClass:
    @pytest.mark.glob("function", x=3)
    def test_something(self):
        pass
```

Here we have the marker "glob" applied three times to the same test function. From a conftest file we can read it like this:

```
# content of conftest.py
import sys

def pytest_runtest_setup(item):
    for mark in item.iter_markers(name="glob"):
        print(f"glob args={mark.args} kwargs={mark.kwargs}")
        sys.stdout.flush()
```

Let's run this without capturing output and see what we get:

```
$ pytest -q -s
glob args=('function',) kwargs={'x': 3}
glob args=('class',) kwargs={'x': 2}
glob args=('module',) kwargs={'x': 1}
.
1 passed in 0.12s
```

Marking platform specific tests with pytest

Consider you have a test suite which marks tests for particular platforms, namely pytest.mark.darwin, pytest. mark.win32 etc. and you also have tests that run on all platforms and have no specific marker. If you now want to have a way to only run the tests for your particular platform, you could use the following plugin:

```
# content of conftest.py
import sys
import pytest
ALL = set("darwin linux win32".split())
def pytest_runtest_setup(item):
   supported_platforms = ALL.intersection(mark.name for mark in item.iter_markers())
   plat = sys.platform
    if supported_platforms and plat not in supported_platforms:
        pytest.skip(f"cannot run on platform {plat}")
```

then tests will be skipped if they were specified for a different platform. Let's do a little test file to show how this looks like:

```
# content of test_plat.py
import pytest
@pytest.mark.darwin
def test_if_apple_is_evil():
   pass
@pytest.mark.linux
def test_if_linux_works():
   pass
@pytest.mark.win32
def test_if_win32_crashes():
   pass
def test_runs_everywhere():
```

then you will see two tests skipped and two executed tests as expected:

```
$ pytest -rs # this option reports skip reasons
platform linux -- Python 3.x.y, pytest-8.x.y, pluggy-1.x.y
rootdir: /home/sweet/project
collected 4 items
                                                 [100%]
test_plat.py s.s.
```

Note that if you specify a platform via the marker-command line option like this:

then the unmarked-tests will not be run. It is thus a way to restrict the run to the specific tests.

Automatically adding markers based on test names

If you have a test suite where test function names indicate a certain type of test, you can implement a hook that automatically defines markers so that you can use the -m option with it. Let's look at this test module:

```
# content of test_module.py

def test_interface_simple():
    assert 0

def test_interface_complex():
    assert 0

def test_event_simple():
    assert 0

def test_something_else():
    assert 0
```

We want to dynamically define two markers and can do it in a conftest.py plugin:

We can now use the -m option to select one set:

```
$ pytest -m interface --tb=short
platform linux -- Python 3.x.y, pytest-8.x.y, pluggy-1.x.y
rootdir: /home/sweet/project
collected 4 items / 2 deselected / 2 selected
test_module.py FF
                                                       [100%]
_____ test_interface_simple _____
test_module.py:4: in test_interface_simple
  assert 0
 assert 0
                    _test_interface_complex __
test_module.py:8: in test_interface_complex
  assert 0
 assert 0
============= short test summary info =======================
FAILED test_module.py::test_interface_simple - assert 0
FAILED test_module.py::test_interface_complex - assert 0
============== 2 failed, 2 deselected in 0.12s =================================
```

or to select both "event" and "interface" tests:

```
$ pytest -m "interface or event" --tb=short
platform linux -- Python 3.x.y, pytest-8.x.y, pluggy-1.x.y
rootdir: /home/sweet/project
collected 4 items / 1 deselected / 3 selected
                                                       [100%]
test_module.py FFF
_____ test_interface_simple _
test_module.py:4: in test_interface_simple
  assert 0
E assert 0
                    _ test_interface_complex __
test_module.py:8: in test_interface_complex
  assert 0
 assert 0
                     _ test_event_simple __
test_module.py:12: in test_event_simple
=========== short test summary info =========================
FAILED test_module.py::test_interface_simple - assert 0
FAILED test_module.py::test_interface_complex - assert 0
FAILED test_module.py::test_event_simple - assert 0
========= 3 failed, 1 deselected in 0.12s ===================
```

5.1.5 A session-fixture which can look at all collected tests

A session-scoped fixture effectively has access to all collected test items. Here is an example of a fixture function which walks all collected tests and looks if their test class defines a callme method and calls it:

test classes may now define a callme method which will be called ahead of running any tests:

```
# content of test_module.py
class TestHello:
   @classmethod
    def callme(cls):
        print("callme called!")
    def test_method1(self):
        print("test_method1 called")
    def test_method2(self):
        print("test_method2 called")
class TestOther:
   @classmethod
   def callme(cls):
       print("callme other called")
    def test_other(self):
        print("test other")
# works with unittest as well ...
import unittest
class SomeTest (unittest.TestCase):
   @classmethod
    def callme(self):
        print("SomeTest callme called")
    def test_unit1(self):
```

(continues on next page)

```
print("test_unit1 method called")
```

If you run this without output capturing:

```
$ pytest -q -s test_module.py
callattr_ahead_of_alltests called
callme called!
callme other called
SomeTest callme called
test_method1 called
.test_method2 called
.test other
.test_unit1 method called
.
4 passed in 0.12s
```

5.1.6 Changing standard (Python) test discovery

Ignore paths during test collection

You can easily ignore certain test directories and modules during collection by passing the --ignore=path option on the cli. pytest allows multiple --ignore options. Example:

```
tests/
|-- example
| |-- test_example_01.py
| |-- test_example_02.py
| '-- test_example_03.py
|-- foobar
| |-- test_foobar_01.py
| |-- test_foobar_02.py
| '-- test_foobar_03.py
'-- hello
'-- world
| |-- test_world_01.py
| |-- test_world_02.py
| '-- test_world_03.py
```

Now if you invoke pytest with --ignore=tests/foobar/test_foobar_03.py --ignore=tests/hello/, you will see that pytest only collects test-modules, which do not match the patterns specified:

The --ignore-glob option allows to ignore test file paths based on Unix shell-style wildcards. If you want to exclude test-modules that end with _01.py, execute pytest with --ignore-glob='*_01.py'.

Deselect tests during test collection

Tests can individually be deselected during collection by passing the --deselect=item option. For example, say tests/foobar/test_foobar_01.py contains test_a and test_b. You can run all of the tests within tests/except for tests/foobar/test_foobar_01.py::test_a by invoking pytest with --deselect tests/foobar/test_foobar_01.py::test_a.pytest allows multiple --deselect options.

Keeping duplicate paths specified from command line

Default behavior of pytest is to ignore duplicate paths specified from the command line. Example:

```
pytest path_a path_a
...
collected 1 item
...
```

Just collect tests once.

To collect duplicate tests, use the --keep-duplicates option on the cli. Example:

```
pytest --keep-duplicates path_a path_a
...
collected 2 items
...
```

As the collector just works on directories, if you specify twice a single test file, pytest will still collect it twice, no matter if the --keep-duplicates is not specified. Example:

```
pytest test_a.py test_a.py
...
collected 2 items
...
```

Changing directory recursion

You can set the norecursedirs option in an ini-file, for example your pytest.ini in the project root directory:

```
# content of pytest.ini
[pytest]
norecursedirs = .svn _build tmp*
```

This would tell pytest to not recurse into typical subversion or sphinx-build directories or into any tmp prefixed directory.

Changing naming conventions

You can configure different naming conventions by setting the python_files, python_classes and python_functions in your configuration file. Here is an example:

```
# content of pytest.ini
# Example 1: have pytest look for "check" instead of "test"
[pytest]
python_files = check_*.py
python_classes = Check
python_functions = *_check
```

This would make pytest look for tests in files that match the check_* .py glob-pattern, Check prefixes in classes, and functions and methods that match *_check. For example, if we have:

```
# content of check_myapp.py
class CheckMyApp:
    def simple_check(self):
        pass

def complex_check(self):
        pass
```

The test collection would look like this:

You can check for multiple glob patterns by adding a space between the patterns:

```
# Example 2: have pytest look for files with "test" and "example"
# content of pytest.ini
[pytest]
python_files = test_*.py example_*.py
```

1 Note

the python_functions and python_classes options has no effect for unittest.TestCase test discovery because pytest delegates discovery of test case methods to unittest code.

Interpreting cmdline arguments as Python packages

You can use the --pyargs option to make pytest try interpreting arguments as python package names, deriving their file system path and then running the test. For example if you have unittest2 installed you can type:

```
pytest --pyargs unittest2.test.test_skipping -q
```

which would run the respective test module. Like with other options, through an ini-file and the addopts option you can make this change more permanently:

```
# content of pytest.ini
[pytest]
addopts = --pyargs
```

Now a simple invocation of pytest NAME will check if NAME exists as an importable package/module and otherwise treat it as a filesystem path.

Finding out what is collected

You can always peek at the collection tree without running tests like this:

Customizing test collection

You can easily instruct pytest to discover tests from every Python file:

```
# content of pytest.ini
[pytest]
python_files = *.py
```

However, many projects will have a setup.py which they don't want to be imported. Moreover, there may files only importable by a specific python version. For such cases you can dynamically define files to be ignored by listing them in a conftest.py file:

```
# content of conftest.py
import sys

collect_ignore = ["setup.py"]

(continues on next page)
```

```
if sys.version_info[0] > 2:
    collect_ignore.append("pkg/module_py2.py")
```

and then if you have a module file like this:

```
# content of pkg/module_py2.py
def test_only_on_python2():
    try:
        assert 0
    except Exception, e:
        pass
```

and a setup.py dummy file like this:

```
# content of setup.py
0 / 0 # will raise exception if imported
```

If you run with a Python 2 interpreter then you will find the one test and will leave out the setup.py file:

If you run with a Python 3 interpreter both the one test and the setup.py file will be left out:

It's also possible to ignore files based on Unix shell-style wildcards by adding patterns to collect_ignore_glob.

The following example conftest.py ignores the file setup.py and in addition all files that end with *_py2.py when executed with a Python 3 interpreter:

```
# content of conftest.py
import sys

collect_ignore = ["setup.py"]
if sys.version_info[0] > 2:
    collect_ignore_glob = ["*_py2.py"]
```

Since Pytest 2.6, users can prevent pytest from discovering classes that start with Test by setting a boolean __test__ attribute to False.

```
# Will not be discovered as a test
class TestClass:
   __test__ = False
```

5.1.7 Working with non-python tests

A basic example for specifying tests in Yaml files

Here is an example conftest.py (extracted from Ali Afshar's special purpose pytest-yamlwsgi plugin). This conftest.py will collect test*.yaml files and will execute the yaml-formatted content as custom tests:

```
# content of conftest.py
from __future__ import annotations
import pytest
def pytest_collect_file(parent, file_path):
   if file_path.suffix == ".yaml" and file_path.name.startswith("test"):
        return YamlFile.from_parent(parent, path=file_path)
class YamlFile (pytest.File):
   def collect(self):
        # We need a yaml parser, e.g. PyYAML.
        import yaml
        raw = yaml.safe_load(self.path.open(encoding="utf-8"))
        for name, spec in sorted(raw.items()):
            yield YamlItem.from_parent(self, name=name, spec=spec)
class YamlItem (pytest.Item):
   def __init__(self, *, spec, **kwargs):
        super().__init__(**kwargs)
        self.spec = spec
   def runtest(self):
        for name, value in sorted(self.spec.items()):
            # Some custom test execution (dumb example follows).
            if name != value:
                raise YamlException(self, name, value)
   def repr_failure(self, excinfo):
        """Called when self.runtest() raises an exception."""
        if isinstance(excinfo.value, YamlException):
            return "\n".join(
                    "usecase execution failed",
                    " spec failed: {1!r}: {2!r}".format(*excinfo.value.args),
                    " no further details known at this point.",
        return super().repr_failure(excinfo)
```

(continues on next page)

```
def reportinfo(self):
        return self.path, 0, f"usecase: {self.name}"
class YamlException(Exception):
    """Custom exception for error reporting."""
```

You can create a simple example file:

```
# test_simple.yaml
ok:
   sub1: sub1
hello:
   world: world
   some: other
```

and if you installed PyYAML or a compatible YAML-parser you can now execute the test specification:

```
nonpython $ pytest test_simple.yaml
platform linux -- Python 3.x.y, pytest-8.x.y, pluggy-1.x.y
rootdir: /home/sweet/project/nonpython
collected 2 items
test_simple.yaml F.
                                           [100%]
_ usecase: hello _
usecase execution failed
 spec failed: 'some': 'other'
 no further details known at this point.
============ short test summary info ========================
FAILED test_simple.yaml::hello
```

You get one dot for the passing sub1: sub1 check and one failure. Obviously in the above conftest.py you'll want to implement a more interesting interpretation of the yaml-values. You can easily write your own domain specific testing language this way.



repr_failure (excinfo) is called for representing test failures. If you create custom collection nodes you can return an error representation string of your choice. It will be reported as a (red) string.

reportinfo() is used for representing the test location and is also consulted when reporting in verbose mode:

```
nonpython $ pytest -v
platform linux -- Python 3.x.y, pytest-8.x.y, pluggy-1.x.y -- $PYTHON_PREFIX/bin/
→python
cachedir: .pytest_cache
rootdir: /home/sweet/project/nonpython
collecting ... collected 2 items
                                                         (continues on next page)
```

While developing your custom test collection and execution it's also interesting to just look at the collection tree:

5.1.8 Using a custom directory collector

By default, pytest collects directories using <code>pytest.Package</code>, for directories with <code>__init__.py</code> files, and <code>pytest.Dir</code> for other directories. If you want to customize how a directory is collected, you can write your own <code>pytest.Directory</code> collector, and use <code>pytest_collect_directory</code> to hook it up.

A basic example for a directory manifest file

Suppose you want to customize how collection is done on a per-directory basis. Here is an example conftest.py plugin that allows directories to contain a manifest.json file, which defines how the collection should be done for the directory. In this example, only a simple list of files is supported, however you can imagine adding other keys, such as exclusions and globs.

```
# content of conftest.py
from __future__ import annotations

import json

import pytest

class ManifestDirectory(pytest.Directory):
    def collect(self):
        # The standard pytest behavior is to loop over all `test_*.py` files and
        # call `pytest_collect_file` on each file. This collector instead reads
        # the `manifest.json` file and only calls `pytest_collect_file` for the
```

(continues on next page)

```
# files defined there.
manifest_path = self.path / "manifest.json"
manifest = json.loads(manifest_path.read_text(encoding="utf-8"))
ihook = self.ihook
for file in manifest["files"]:
    yield from ihook.pytest_collect_file(
        file_path=self.path / file, parent=self
)

@pytest.hookimpl
def pytest_collect_directory(path, parent):
    # Use our custom collector for directories containing a `manifest.json` file.
    if path.joinpath("manifest.json").is_file():
        return ManifestDirectory.from_parent(parent=parent, path=path)
# Otherwise fallback to the standard behavior.
return None
```

You can create a manifest.json file and some test files:

```
{
    "files": [
        "test_first.py",
        "test_second.py"
    ]
}
```

```
# content of test_first.py
from __future__ import annotations

def test_1():
    pass
```

```
# content of test_second.py
from __future__ import annotations

def test_2():
    pass
```

```
# content of test_third.py
from __future__ import annotations

def test_3():
    pass
```

An you can now execute the test specification:

(continues on next page)

Notice how test_three.py was not executed, because it is not listed in the manifest.

You can verify that your custom collector appears in the collection tree:

5.2 Backwards Compatibility Policy

Pytest is an actively evolving project that has been decades in the making. We keep learning about new and better structures to express different details about testing.

While we implement those modifications, we try to ensure an easy transition and don't want to impose unnecessary churn on our users and community/plugin authors.

As of now, pytest considers multiple types of backward compatibility transitions:

- a) trivial: APIs that trivially translate to the new mechanism and do not cause problematic changes.
 - We try to support those indefinitely while encouraging users to switch to newer or better mechanisms through documentation.
- b) transitional: the old and new APIs don't conflict, and we can help users transition by using warnings while supporting both for a prolonged period of time.

We will only start the removal of deprecated functionality in major releases (e.g., if we deprecate something in 3.0, we will start to remove it in 4.0), and keep it around for at least two minor releases (e.g., if we deprecate something in 3.9 and 4.0 is the next release, we start to remove it in 5.0, not in 4.0).

A deprecated feature scheduled to be removed in major version X will use the warning class PytestRemoved-InXWarning (a subclass of PytestDeprecationWarning).

When the deprecation expires (e.g., 4.0 is released), we won't remove the deprecated functionality immediately but will use the standard warning filters to turn PytestRemovedInXWarning (e.g., PytestRemovedIn4Warning) into errors by default. This approach makes it explicit that removal is imminent and still gives you time to turn the deprecated feature into a warning instead of an error so it can be dealt with in your own time. In the next minor release (e.g., 4.1), the feature will be effectively removed.

c) True breakage should only be considered when a normal transition is unreasonably unsustainable and would offset important developments or features by years. In addition, they should be limited to APIs where the number of actual users is very small (for example, only impacting some plugins) and can be coordinated with the community in advance.

Examples for such upcoming changes:

- removal of pytest runtest protocol/nextitem #895
- rearranging of the node tree to include FunctionDefinition
- rearranging of SetupState #895

True breakages must be announced first in an issue containing:

- Detailed description of the change
- Rationale
- Expected impact on users and plugin authors (example in #895)

After there's no hard -1 on the issue it should be followed up by an initial proof-of-concept Pull Request.

This POC serves as both a coordination point to assess impact and potential inspiration to come up with a transitional solution after all.

After a reasonable amount of time the PR can be merged to base a new major release.

For the PR to mature from POC to acceptance, it must contain: * Setup of deprecation errors/warnings that help users fix and port their code. If it is possible to introduce a deprecation period under the current series, before the true breakage, it should be introduced in a separate PR and be part of the current release stream. * Detailed description of the rationale and examples on how to port code in doc/en/deprecations.rst.

5.3 History

5.3.1 Focus primary on smooth transition - stance (pre 6.0)

Keeping backwards compatibility has a very high priority in the pytest project. Although we have deprecated functionality over the years, most of it is still supported. All deprecations in pytest were done because simpler or more efficient ways of accomplishing the same tasks have emerged, making the old way of doing things unnecessary.

With the pytest 3.0 release, we introduced a clear communication scheme for when we will actually remove the old busted joint and politely ask you to use the new hotness instead, while giving you enough time to adjust your tests or raise concerns if there are valid reasons to keep deprecated functionality around.

To communicate changes, we issue deprecation warnings using a custom warning hierarchy (see *Internal pytest warnings*). These warnings may be suppressed using the standard means: -W command-line flag or filterwarnings ini options (see *How to capture warnings*), but we suggest to use these sparingly and temporarily, and heed the warnings when possible.

We will only start the removal of deprecated functionality in major releases (e.g. if we deprecate something in 3.0, we will start to remove it in 4.0), and keep it around for at least two minor releases (e.g. if we deprecate something in 3.9 and 4.0 is the next release, we start to remove it in 5.0, not in 4.0).

When the deprecation expires (e.g. 4.0 is released), we won't remove the deprecated functionality immediately, but will use the standard warning filters to turn them into **errors** by default. This approach makes it explicit that removal is imminent, and still gives you time to turn the deprecated feature into a warning instead of an error so it can be dealt with in your own time. In the next minor release (e.g. 4.1), the feature will be effectively removed.

Deprecation Roadmap

Features currently deprecated and removed in previous releases can be found in *Deprecations and Removals*.

We track future deprecation and removal of features using milestones and the deprecation and removal labels on GitHub.

5.4 Python version support

Released pytest versions support all Python versions that are actively maintained at the time of the release:

pytest version	min. Python version
8.0+	3.8+
7.1+	3.7+
6.2 - 7.0	3.6+
5.0 - 6.1	3.5+
3.3 - 4.6	2.7, 3.4+

Status of Python Versions.

5.5 Deprecations and Removals

This page lists all pytest features that are currently deprecated or have been removed in past major releases. The objective is to give users a clear rationale why a certain feature has been removed, and what alternatives should be used instead.

5.5.1 Deprecated Features

Below is a complete list of all pytest features which are considered deprecated. Using those features will issue Pytest-Warning or subclasses, which can be filtered using standard warning filters.

pytest.importorskip default behavior regarding ImportError

Deprecated since version 8.2.

Traditionally *pytest.importorskip()* will capture ImportError, with the original intent being to skip tests where a dependent module is not installed, for example testing with different dependencies.

However some packages might be installed in the system, but are not importable due to some other issue, for example, a compilation error or a broken installation. In those cases <code>pytest.importorskip()</code> would still silently skip the test, but more often than not users would like to see the unexpected error so the underlying issue can be fixed.

In 8.2 the exc_type parameter has been added, giving users the ability of passing ModuleNotFoundError to skip tests only if the module cannot really be found, and not because of some other error.

Catching only ModuleNotFoundError by default (and letting other errors propagate) would be the best solution, however for backward compatibility, pytest will keep the existing behavior but raise an warning if:

- 1. The captured exception is of type ImportError, and:
- 2. The user does not pass exc_type explicitly.

If the import attempt raises ModuleNotFoundError (the usual case), then the module is skipped and no warning is emitted.

This way, the usual cases will keep working the same way, while unexpected errors will now issue a warning, with users being able to suppress the warning by passing exc_type=ImportError explicitly.

In 9.0, the warning will turn into an error, and in 9.1 pytest.importorskip() will only capture ModuleNot-FoundError by default and no warnings will be issued anymore – but users can still capture ImportError by passing it to exc_type.

fspath argument for Node constructors replaced with pathlib.Path

Deprecated since version 7.0.

In order to support the transition from py.path.local to pathlib, the fspath argument to Node constructors like pytest.Function.from_parent() and pytest.Class.from_parent() is now deprecated.

Plugins which construct nodes should pass the path argument, of type pathlib.Path, instead of the fspath argument.

Plugins which implement custom items and collectors are encouraged to replace fspath parameters (py.path. local) with path parameters (pathlib.Path), and drop any other usage of the py library if possible.

If possible, plugins with custom items should use *cooperative constructors* to avoid hardcoding arguments they only pass on to the superclass.

1 Note

The name of the *Node* arguments and attributes (the new attribute being path) is **the opposite** of the situation for hooks, *outlined below* (the old argument being path).

This is an unfortunate artifact due to historical reasons, which should be resolved in future versions as we slowly get rid of the py dependency (see #9283 for a longer discussion).

Due to the ongoing migration of methods like <code>reportinfo()</code> which still is expected to return a <code>py.path.local</code> object, nodes still have both <code>fspath(py.path.local)</code> and <code>path(pathlib.Path)</code> attributes, no matter what argument was used in the constructor. We expect to deprecate the <code>fspath</code> attribute in a future release.

Configuring hook specs/impls using markers

Before pluggy, pytest's plugin library, was its own package and had a clear API, pytest just used pytest.mark to configure hooks.

The pytest.hookimpl() and pytest.hookspec() decorators have been available since years and should be used instead.

```
@pytest.mark.tryfirst
def pytest_runtest_call(): ...

# or
def pytest_runtest_call(): ...

pytest_runtest_call.tryfirst = True
```

should be changed to:

```
@pytest.hookimpl(tryfirst=True)
def pytest_runtest_call(): ...
```

Changed hookimpl attributes:

- tryfirst
- trylast
- optionalhook
- hookwrapper

Changed hookwrapper attributes:

- firstresult
- historic

py.path.local arguments for hooks replaced with pathlib.Path

Deprecated since version 7.0.

In order to support the transition from py.path.local to pathlib, the following hooks now receive additional arguments:

- pytest_ignore_collect(collection_path: pathlib.Path) as equivalent to path
- pytest_collect_file(file_path: pathlib.Path) as equivalent to path
- pytest_pycollect_makemodule(module_path: pathlib.Path) as equivalent to path
- pytest_report_header(start_path: pathlib.Path) as equivalent to startdir
- pytest_report_collectionfinish(start_path: pathlib.Path) as equivalent to start-dir

The accompanying py.path.local based paths have been deprecated: plugins which manually invoke those hooks should only pass the new pathlib.Path arguments, and users should change their hook implementations to use the new pathlib.Path arguments.



The name of the *Node* arguments and attributes, *outlined above* (the new attribute being path) is **the opposite** of the situation for hooks (the old argument being path).

This is an unfortunate artifact due to historical reasons, which should be resolved in future versions as we slowly get rid of the py dependency (see #9283 for a longer discussion).

Directly constructing internal classes

Deprecated since version 7.0.

Directly constructing the following classes is now deprecated:

```
• _pytest.mark.structures.Mark
```

- _pytest.mark.structures.MarkDecorator
- _pytest.mark.structures.MarkGenerator
- _pytest.python.Metafunc
- _pytest.runner.CallInfo
- _pytest._code.ExceptionInfo
- _pytest.config.argparsing.Parser
- _pytest.config.argparsing.OptionGroup
- _pytest.pytester.HookRecorder

These constructors have always been considered private, but now issue a deprecation warning, which may become a hard error in pytest 8.

Diamond inheritance between pytest.Collector and pytest.Item

Deprecated since version 7.0.

Defining a custom pytest node type which is both an *Item* and a *Collector* (e.g. *File*) now issues a warning. It was never sanely supported and triggers hard to debug errors.

Some plugins providing linting/code analysis have been using this as a hack. Instead, a separate collector node should be used, which collects the item. See *Working with non-python tests* for an example, as well as an example pr fixing inheritance.

Constructors of custom Node subclasses should take **kwargs

Deprecated since version 7.0.

If custom subclasses of nodes like *pytest.Item* override the __init__ method, they should take **kwargs. Thus,

```
class CustomItem(pytest.Item):
    def __init__(self, name, parent, additional_arg):
        super().__init__(name, parent)
        self.additional_arg = additional_arg
```

should be turned into:

```
class CustomItem(pytest.Item):
    def __init__(self, *, additional_arg, **kwargs):
        super().__init__(**kwargs)
        self.additional_arg = additional_arg
```

to avoid hard-coding the arguments pytest can pass to the superclass. See Working with non-python tests for a full example.

For cases without conflicts, no deprecation warning is emitted. For cases with conflicts (such as pytest.File now taking path instead of fspath, as *outlined above*), a deprecation warning is now raised.

Applying a mark to a fixture function

Deprecated since version 7.4.

Applying a mark to a fixture function never had any effect, but it is a common user error.

```
@pytest.mark.usefixtures("clean_database")
@pytest.fixture
def user() -> User: ...
```

Users expected in this case that the usefixtures mark would have its intended effect of using the clean_database fixture when user was invoked, when in fact it has no effect at all.

Now pytest will issue a warning when it encounters this problem, and will raise an error in the future versions.

Returning non-None value in test functions

Deprecated since version 7.2.

 $A \textit{pytest.PytestReturnNotNoneWarning} \ is \ now \ emitted \ if \ a \ test \ function \ returns \ something \ other \ than \ None.$

This prevents a common mistake among beginners that expect that returning a bool would cause a test to pass or fail, for example:

Given that pytest ignores the return value, this might be surprising that it will never fail.

The proper fix is to change the return to an assert:

The yield_fixture function/decorator

Deprecated since version 6.2.

```
pytest.yield_fixture is a deprecated alias for pytest.fixture().
```

It has been so for a very long time, so can be search/replaced safely.

5.5.2 Removed Features and Breaking Changes

As stated in our *Backwards Compatibility Policy* policy, deprecated features are removed only in major releases after an appropriate period of deprecation has passed.

Some breaking changes which could not be deprecated are also listed.

Support for tests written for nose

Deprecated since version 7.2.

Removed in version 8.0.

Support for running tests written for nose is now deprecated.

nose has been in maintenance mode-only for years, and maintaining the plugin is not trivial as it spills over the code base (see #9886 for more details).

setup/teardown

One thing that might catch users by surprise is that plain setup and teardown methods are not pytest native, they are in fact part of the nose support.

```
class Test:
    def setup(self):
        self.resource = make_resource()

    def teardown(self):
        self.resource.close()

    def test_foo(self): ...

    def test_bar(self): ...
```

Native pytest support uses setup_method and teardown_method (see *Method and function level setup/teardown*), so the above should be changed to:

```
class Test:
    def setup_method(self):
        self.resource = make_resource()

    def teardown_method(self):
        self.resource.close()

    def test_foo(self): ...

    def test_bar(self): ...
```

This is easy to do in an entire code base by doing a simple find/replace.

@with_setup

Code using @with setup such as this:

```
from nose.tools import with_setup

def setup_some_resource(): ...

def teardown_some_resource(): ...

@with_setup(setup_some_resource, teardown_some_resource)
def test_foo(): ...
```

Will also need to be ported to a supported pytest style. One way to do it is using a fixture:

```
def setup_some_resource(): ...

def teardown_some_resource(): ...

@pytest.fixture
def some_resource():
    setup_some_resource()
    yield
    teardown_some_resource()

def test_foo(some_resource): ...
```

The compat_co_firstlineno attribute

Nose inspects this attribute on function objects to allow overriding the function's inferred line number. Pytest no longer respects this attribute.

Passing msg= to pytest.skip, pytest.fail or pytest.exit

Deprecated since version 7.0.

Removed in version 8.0.

Passing the keyword argument msg to pytest.skip(), pytest.fail() or pytest.exit() is now deprecated and reason should be used instead. This change is to bring consistency between these functions and the @pytest.mark.skip and @pytest.mark.xfail markers which already accept a reason argument.

```
def test_fail_example():
    # old
    pytest.fail(msg="foo")
    # new
    pytest.fail(reason="bar")

def test_skip_example():
    # old
    pytest.skip(msg="foo")
    # new
    pytest.skip(reason="bar")

def test_exit_example():
    # old
    pytest.exit(msg="foo")
    # new
    pytest.exit(msg="foo")
```

The pytest. Instance collector

Removed in version 7.0.

The pytest.Instance collector type has been removed.

Previously, Python test methods were collected as Class -> Instance -> Function. Now Class collects the test methods directly.

Most plugins which reference Instance do so in order to ignore or skip it, using a check such as if isinstance(node, Instance): return. Such plugins should simply remove consideration of Instance on pytest>=7. However, to keep such uses working, a dummy type has been instanced in pytest.Instance and _pytest.python.Instance, and importing it emits a deprecation warning. This was removed in pytest 8.

Using pytest.warns(None)

Deprecated since version 7.0.

Removed in version 8.0.

pytest.warns (None) is now deprecated because it was frequently misused. Its correct usage was checking that the code emits at least one warning of any type - like pytest.warns () or pytest.warns (Warning).

See Additional use cases of warnings in tests for examples.

Backward compatibilities in Parser.addoption

Deprecated since version 2.4.

Removed in version 8.0.

Several behaviors of Parser. addoption are now removed in pytest 8 (deprecated since pytest 2.4.0):

```
• parser.addoption(..., help=".. %default ..") - use % (default) s instead.
```

• parser.addoption(..., type="int/string/float/complex") - use type=int etc. instead.

The --strict command-line option

Deprecated since version 6.2.

Removed in version 8.0.

The --strict command-line option has been deprecated in favor of --strict-markers, which better conveys what the option does.

We have plans to maybe in the future to reintroduce ——strict and make it an encompassing flag for all strictness related options (——strict—markers and ——strict—config at the moment, more might be introduced in the future).

Implementing the pytest_cmdline_preparse hook

Deprecated since version 7.0.

Removed in version 8.0.

Implementing the pytest_cmdline_preparse hook has been officially deprecated. Implement the pytest_load_initial_conftests hook instead.

```
def pytest_cmdline_preparse(config: Config, args: List[str]) -> None: ...

# becomes:

def pytest_load_initial_conftests(
    early_config: Config, parser: Parser, args: List[str]
) -> None: ...
```

Collection changes in pytest 8

Added a new pytest.Directory base collection node, which all collector nodes for filesystem directories are expected to subclass. This is analogous to the existing pytest.File for file nodes.

Changed pytest.Package to be a subclass of pytest.Directory. A Package represents a filesystem directory which is a Python package, i.e. contains an __init__.py file.

pytest.Package now only collects files in its own directory; previously it collected recursively. Sub-directories are collected as sub-collector nodes, thus creating a collection tree which mirrors the filesystem hierarchy.

session.name is now ""; previously it was the rootdir directory name. This matches session.nodeid which has always been "".

Added a new pytest.Dir concrete collection node, a subclass of pytest.Directory. This node represents a filesystem directory, which is not a pytest.Package, i.e. does not contain an __init__.py file. Similarly to Package, it only collects the files in its own directory, while collecting sub-directories as sub-collector nodes.

Files and directories are now collected in alphabetical order jointly, unless changed by a plugin. Previously, files were collected before directories.

The collection tree now contains directories/packages up to the *rootdir*, for initial arguments that are found within the rootdir. For files outside the rootdir, only the immediate directory/package is collected – note however that collecting from outside the rootdir is discouraged.

As an example, given the following filesystem tree:

the collection tree, as shown by pytest --collect-only top/ but with the otherwise-hidden Session node added for clarity, is now the following:

```
<Session>
 <Dir myroot>
   <Dir top>
     <Dir aaa>
       <Module test_aaa.py>
         <Function test_it>
     <Module test_a.py>
       <Function test_it>
     <Package test_b>
       <Module test_b.py>
         <Function test_it>
     <Module test_c.py>
       <Function test_it>
     <Package zzz>
       <Module test_zzz.py>
         <Function test_it>
```

Previously, it was:

```
<Session>
  <Module top/test_a.py>
        <Function test_it>
  <Module top/test_c.py>
        <Function test_it>

<Module top/aaa/test_aaa.py>
        <Function test_it>

<Package test_b>
        <Module test_b.py>
        <Function test_it>

<Package zzz>
        <Module test_zzz.py>
        <Function test_it>
```

Code/plugins which rely on a specific shape of the collection tree might need to update.

pytest.Package is no longer a pytest.Module or pytest.File

Changed in version 8.0.

The Package collector node designates a Python package, that is, a directory with an __init__.py file. Previously Package was a subtype of pytest.Module (which represents a single Python module), the module being the __init__.py file. This has been deemed a design mistake (see #11137 and #7777 for details).

The path property of Package nodes now points to the package directory instead of the __init__.py file.

Note that a Module node for __init__.py (which is not a Package) may still exist, if it is picked up during collection (e.g. if you configured python_files to include __init__.py files).

Collecting __init__.py files no longer collects package

Removed in version 8.0.

Running pytest pkg/__init__.py now collects the pkg/__init__.py file (module) only. Previously, it collected the entire pkg package, including other test files in the directory, but excluding tests in the __init__.py file itself (unless python_files was changed to allow __init__.py file).

To collect the entire package, specify just the directory: pytest pkg.

The pytest.collect module

Deprecated since version 6.0.

Removed in version 7.0.

The pytest.collect module is no longer part of the public API, all its names should now be imported from pytest directly instead.

The pytest_warning_captured hook

Deprecated since version 6.0.

Removed in version 7.0.

This hook has an item parameter which cannot be serialized by pytest-xdist.

Use the pytest_warning_recorded hook instead, which replaces the item parameter by a nodeid parameter.

The pytest._fillfuncargs function

Deprecated since version 6.0.

Removed in version 7.0.

This function was kept for backward compatibility with an older plugin.

It's functionality is not meant to be used directly, but if you must replace it, use function._request._fillfixtures() instead, though note this is not a public API and may break in the future.

--no-print-logs command-line option

Deprecated since version 5.4.

Removed in version 6.0.

The --no-print-logs option and log_print ini setting are removed. If you used them, please use --show-capture instead.

A --show-capture command-line option was added in pytest 3.5.0 which allows to specify how to display captured output when tests fail: no, stdout, stderr, log or all (the default).

Result log (--result-log)

Deprecated since version 4.0.

Removed in version 6.0.

The --result-log option produces a stream of test reports which can be analysed at runtime, but it uses a custom format which requires users to implement their own parser.

The pytest-reportlog plugin provides a --report-log option, a more standard and extensible alternative, producing one JSON object per-line, and should cover the same use cases. Please try it out and provide feedback.

The pytest-reportlog plugin might even be merged into the core at some point, depending on the plans for the plugins and number of users using it.

pytest_collect_directory hook

Removed in version 6.0.

The pytest_collect_directory hook has not worked properly for years (it was called but the results were ignored). Users may consider using pytest_collection_modifyitems instead.

TerminalReporter.writer

Removed in version 6.0.

The TerminalReporter.writer attribute has been deprecated and should no longer be used. This was inadvertently exposed as part of the public API of that plugin and ties it too much with py.io.TerminalWriter.

Plugins that used TerminalReporter.writer directly should instead use TerminalReporter methods that provide the same functionality.

junit_family default value change to "xunit2"

Changed in version 6.0.

The default value of junit_family option will change to xunit2 in pytest 6.0, which is an update of the old xunit1 format and is supported by default in modern tools that manipulate this type of file (for example, Jenkins, Azure Pipelines, etc.).

Users are recommended to try the new xunit2 format and see if their tooling that consumes the JUnit XML file supports it

To use the new format, update your pytest.ini:

```
[pytest]
junit_family=xunit2
```

If you discover that your tooling does not support the new format, and want to keep using the legacy version, set the option to legacy instead:

```
[pytest]
junit_family=legacy
```

By using legacy you will keep using the legacy/xunit1 format when upgrading to pytest 6.0, where the default format will be xunit2.

In order to let users know about the transition, pytest will issue a warning in case the --junit-xml option is given in the command line but junit_family is not explicitly configured in pytest.ini.

Services known to support the xunit2 format:

- Jenkins with the JUnit plugin.
- · Azure Pipelines.

Node Construction changed to Node.from_parent

Changed in version 6.0.

The construction of nodes now should use the named constructor from_parent. This limitation in api surface intends to enable better/simpler refactoring of the collection tree.

This means that instead of MyItem(name="foo", parent=collector, obj=42) one now has to invoke MyItem.from_parent(collector, name="foo").

Plugins that wish to support older versions of pytest and suppress the warning can use hasattr to check if from_parent exists in that version:

```
def pytest_pycollect_makeitem(collector, name, obj):
    if hasattr(MyItem, "from_parent"):
        item = MyItem.from_parent(collector, name="foo")
        item.obj = 42
        return item
    else:
        return MyItem(name="foo", parent=collector, obj=42)
```

Note that from_parent should only be called with keyword arguments for the parameters.

pytest.fixture arguments are keyword only

Removed in version 6.0.

Passing arguments to pytest.fixture() as positional arguments has been removed - pass them by keyword instead.

funcargnames alias for fixturenames

Removed in version 6.0.

The FixtureRequest, Metafunc, and Function classes track the names of their associated fixtures, with the aptly-named fixturenames attribute.

Prior to pytest 2.3, this attribute was named funcargnames, and we have kept that as an alias since. It is finally due for removal, as it is often confusing in places where we or plugin authors must distinguish between fixture names and names supplied by non-fixture things such as pytest.mark.parametrize.

pytest.config global

Removed in version 5.0.

The pytest.config global object is deprecated. Instead use request.config (via the request fixture) or if you are a plugin author use the pytest_configure (config) hook. Note that many hooks can also access the config object indirectly, through session.config or item.config for example.

"message" parameter of pytest.raises

Removed in version 5.0.

It is a common mistake to think this parameter will match the exception message, while in fact it only serves to provide a custom message in case the pytest.raises check fails. To prevent users from making this mistake, and because it is believed to be little used, pytest is deprecating it without providing an alternative for the moment.

If you have a valid use case for this parameter, consider that to obtain the same results you can just call pytest.fail manually at the end of the with statement.

For example:

```
with pytest.raises(TimeoutError, message="Client got unexpected message"):
    wait_for(websocket.recv(), 0.5)
```

Becomes:

```
with pytest.raises(TimeoutError):
    wait_for(websocket.recv(), 0.5)
    pytest.fail("Client got unexpected message")
```

If you still have concerns about this deprecation and future removal, please comment on #3974.

raises / warns with a string as the second argument

Removed in version 5.0.

Use the context manager form of these instead. When necessary, invoke exec directly.

Example:

```
pytest.raises(ZeroDivisionError, "1 / 0")
pytest.raises(SyntaxError, "a $ b")

pytest.warns(DeprecationWarning, "my_function()")
pytest.warns(SyntaxWarning, "assert(1, 2)")
```

Becomes:

```
with pytest.raises(ZeroDivisionError):
    1 / 0
with pytest.raises(SyntaxError):
    exec("a $ b") # exec is required for invalid syntax

with pytest.warns(DeprecationWarning):
    my_function()
with pytest.warns(SyntaxWarning):
    exec("assert(1, 2)") # exec is used to avoid a top-level warning
```

Using Class in custom Collectors

Removed in version 4.0.

Using objects named "Class" as a way to customize the type of nodes that are collected in Collector subclasses has been deprecated. Users instead should use pytest_pycollect_makeitem to customize node types during collection.

This issue should affect only advanced plugins who create new collection types, so if you see this warning message please contact the authors so they can change the code.

marks in pytest.mark.parametrize

Removed in version 4.0.

Applying marks to values of a pytest.mark.parametrize call is now deprecated. For example:

```
@pytest.mark.parametrize(
    "a, b",
    [
          (3, 9),
          pytest.mark.xfail(reason="flaky")(6, 36),
          (10, 100),
          (20, 200),
          (40, 400),
          (50, 500),
    ],
)
def test_foo(a, b): ...
```

This code applies the pytest.mark.xfail(reason="flaky") mark to the (6, 36) value of the above parametrization call.

This was considered hard to read and understand, and also its implementation presented problems to the code preventing further internal improvements in the marks architecture.

To update the code, use pytest.param:

```
@pytest.mark.parametrize(
    "a, b",
    [
        (3, 9),
        pytest.param(6, 36, marks=pytest.mark.xfail(reason="flaky")),
        (10, 100),
```

(continues on next page)

```
(20, 200),

(40, 400),

(50, 500),

],

)

def test_foo(a, b): ...
```

pytest_funcarg__ prefix

Removed in version 4.0.

In very early pytest versions fixtures could be defined using the pytest_funcarg__ prefix:

```
def pytest_funcarg__data():
    return SomeData()
```

Switch over to the @pytest.fixture decorator:

```
@pytest.fixture
def data():
    return SomeData()
```

[pytest] section in setup.cfg files

Removed in version 4.0.

[pytest] sections in setup.cfg files should now be named [tool:pytest] to avoid conflicts with other distutils commands.

Metafunc.addcall

Removed in version 4.0.

Metafunc.addcall was a precursor to the current parametrized mechanism. Users should use pytest. Metafunc.parametrize() instead.

Example:

```
def pytest_generate_tests(metafunc):
    metafunc.addcall({"i": 1}, id="1")
    metafunc.addcall({"i": 2}, id="2")
```

Becomes:

```
def pytest_generate_tests(metafunc):
   metafunc.parametrize("i", [1, 2], ids=["1", "2"])
```

cached_setup

Removed in version 4.0.

request.cached_setup was the precursor of the setup/teardown mechanism available to fixtures.

Example:

```
@pytest.fixture
def db_session():
    return request.cached_setup(
        setup=Session.create, teardown=lambda session: session.close(), scope="module"
    )
```

This should be updated to make use of standard fixture mechanisms:

```
@pytest.fixture(scope="module")
def db_session():
    session = Session.create()
    yield session
    session.close()
```

You can consult funcarg comparison section in the docs for more information.

pytest plugins in non-top-level conftest files

Removed in version 4.0.

Defining <code>pytest_plugins</code> is now deprecated in non-top-level conftest.py files because they will activate referenced plugins <code>globally</code>, which is surprising because for all other pytest features <code>conftest.py</code> files are only <code>active</code> for tests at or below it.

Config.warn and Node.warn

Removed in version 4.0.

Those methods were part of the internal pytest warnings system, but since 3.8 pytest is using the builtin warning system for its own warnings, so those two functions are now deprecated.

Config.warn should be replaced by calls to the standard warnings.warn, example:

```
config.warn("C1", "some warning")
```

Becomes:

```
warnings.warn(pytest.PytestWarning("some warning"))
```

Node.warn now supports two signatures:

- node.warn (PytestWarning ("some message")): is now the **recommended** way to call this function. The warning instance must be a PytestWarning or subclass.
- node.warn("CI", "some message"): this code/message form has been removed and should be converted to the warning instance form above.

record_xml_property

Removed in version 4.0.

The record_xml_property fixture is now deprecated in favor of the more generic record_property, which can be used by other consumers (for example pytest-html) to obtain custom information about the test run.

This is just a matter of renaming the fixture as the API is the same:

```
def test_foo(record_xml_property): ...
```

Change to:

```
def test_foo(record_property): ...
```

Passing command-line string to pytest.main()

Removed in version 4.0.

Passing a command-line string to pytest.main() is deprecated:

```
pytest.main("-v -s")
```

Pass a list instead:

```
pytest.main(["-v", "-s"])
```

By passing a string, users expect that pytest will interpret that command-line using the shell rules they are working on (for example bash or Powershell), but this is very hard/impossible to do in a portable way.

Calling fixtures directly

Removed in version 4.0.

Calling a fixture function directly, as opposed to request them in a test function, is deprecated.

For example:

```
@pytest.fixture
def cell():
    return ...

@pytest.fixture
def full_cell():
    cell = cell()
    cell.make_full()
    return cell
```

This is a great source of confusion to new users, which will often call the fixture functions and request them from test functions interchangeably, which breaks the fixture resolution model.

In those cases just request the function directly in the dependent fixture:

```
@pytest.fixture
def cell():
    return ...

@pytest.fixture
def full_cell(cell):
    cell.make_full()
    return cell
```

Alternatively if the fixture function is called multiple times inside a test (making it hard to apply the above pattern) or if you would like to make minimal changes to the code, you can create a fixture which calls the original function together with the name parameter:

```
def cell():
    return ...

@pytest.fixture(name="cell")
def cell_fixture():
    return cell()
```

yield tests

Removed in version 4.0.

pytest supported yield-style tests, where a test function actually yield functions and values that are then turned into proper test methods. Example:

```
def check(x, y):
    assert x**x == y

def test_squared():
    yield check, 2, 4
    yield check, 3, 9
```

This would result into two actual test functions being generated.

This form of test function doesn't support fixtures properly, and users should switch to pytest.mark.parametrize:

```
@pytest.mark.parametrize("x, y", [(2, 4), (3, 9)])
def test_squared(x, y):
    assert x**x == y
```

Internal classes accessed through Node

Removed in version 4.0.

Access of Module, Function, Class, Instance, File and Item through Node instances now issue this warning:

```
usage of Function.Module is deprecated, please use pytest.Module instead
```

Users should just import pytest and access those objects using the pytest module.

This has been documented as deprecated for years, but only now we are actually emitting deprecation warnings.

Node.get_marker

Removed in version 4.0.

As part of a large *Marker revamp and iteration*, _pytest.nodes.Node.get_marker is removed. See the documentation on tips on how to update your code.

somefunction.markname

Removed in version 4.0.

As part of a large *Marker revamp and iteration* we already deprecated using MarkInfo the only correct way to get markers of an element is via node.iter_markers (name).

pytest_namespace

Removed in version 4.0.

This hook is deprecated because it greatly complicates the pytest internals regarding configuration and initialization, making some bug fixes and refactorings impossible.

Example of usage:

```
class MySymbol: ...

def pytest_namespace():
    return {"my_symbol": MySymbol()}
```

Plugin authors relying on this hook should instead require that users now import the plugin modules directly (with an appropriate public API).

As a stopgap measure, plugin authors may still inject their names into pytest's namespace, usually during pytest_configure:

```
import pytest

def pytest_configure():
    pytest.my_symbol = MySymbol()
```

5.6 Contributing

Contributions are highly welcomed and appreciated. Every little bit of help counts, so do not hesitate!

5.6.1 Feature requests and feedback

Do you like pytest? Share some love on Twitter or in your blog posts!

We'd also like to hear about your propositions and suggestions. Feel free to submit them as issues and:

- Explain in detail how they should work.
- Keep the scope as narrow as possible. This will make it easier to implement.

5.6.2 Report bugs

Report bugs for pytest in the issue tracker.

If you are reporting a bug, please include:

- Your operating system name and version.
- Any details about your local setup that might be helpful in troubleshooting, specifically the Python interpreter version, installed libraries, and pytest version.
- Detailed steps to reproduce the bug.

If you can write a demonstration test that currently fails but should pass (xfail), that is a very useful commit to make as well, even if you cannot fix the bug itself.

5.6.3 Fix bugs

Look through the GitHub issues for bugs. See also the "good first issue" issues that are friendly to new contributors.

Talk to developers to find out how you can fix specific bugs. To indicate that you are going to work on a particular issue, add a comment to that effect on the specific issue.

Don't forget to check the issue trackers of your favourite plugins, too!

5.6.4 Implement features

Look through the GitHub issues for enhancements.

Talk to developers to find out how you can implement specific features.

5.6.5 Write documentation

Pytest could always use more documentation. What exactly is needed?

- More complementary documentation. Have you perhaps found something unclear?
- Documentation translations. We currently have only English.
- Docstrings. There can never be too many of them.
- Blog posts, articles and such they're all very appreciated.

You can also edit documentation files directly in the GitHub web interface, without using a local copy. This can be convenient for small fixes.

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1 Note

Build the documentation locally with the following command:

```
$ tox -e docs
```

The built documentation should be available in doc/en/_build/html, where 'en' refers to the documentation language.

Pytest has an API reference which in large part is generated automatically from the docstrings of the documented items. Pytest uses the Sphinx docstring format. For example:

```
def my_function(arg: ArgType) -> Foo:
   """Do important stuff.
   More detailed info here, in separate paragraphs from the subject line.
   Use proper sentences -- start sentences with capital letters and end
   with periods.
   Can include annotated documentation:
   :param short_arg: An argument which determines stuff.
   :param long_arg:
       A long explanation which spans multiple lines, overflows
       like this.
   :returns: The result.
    :raises ValueError:
       Detailed information when this can happen.
    .. versionadded:: 6.0
   Including types into the annotations above is not necessary when
    type-hinting is being used (as in this example).
```

5.6.6 Submitting Plugins to pytest-dev

Development of the pytest core, support code, and some plugins happens in repositories living under the pytest-dev organisations:

· pytest-dev on GitHub

All pytest-dev Contributors team members have write access to all contained repositories. Pytest core and plugins are generally developed using *pull requests* to respective repositories.

The objectives of the pytest-dev organisation are:

- Having a central location for popular pytest plugins
- Sharing some of the maintenance responsibility (in case a maintainer no longer wishes to maintain a plugin)

You can submit your plugin by subscribing to the pytest-dev mail list and writing a mail pointing to your existing pytest plugin repository which must have the following:

- PyPI presence with packaging metadata that contains a pytest- prefixed name, version number, authors, short and long description.
- a tox configuration for running tests using tox.

- a README describing how to use the plugin and on which platforms it runs.
- a LICENSE file containing the licensing information, with matching info in its packaging metadata.
- an issue tracker for bug reports and enhancement requests.
- · a changelog.

If no contributor strongly objects and two agree, the repository can then be transferred to the pytest-dev organisation.

Here's a rundown of how a repository transfer usually proceeds (using a repository named joedoe/pytest-xyz as example):

- joedoe transfers repository ownership to pytest-dev administrator calvin.
- calvin creates pytest-xyz-admin and pytest-xyz-developers teams, inviting joedoe to both as
 maintainer.
- calvin transfers repository to pytest-dev and configures team access:
 - pytest-xyz-admin admin access;
 - pytest-xyz-developers write access;

The pytest-dev/Contributors team has write access to all projects, and every project administrator is in it. We recommend that each plugin has at least three people who have the right to release to PyPI.

Repository owners can rest assured that no pytest-dev administrator will ever make releases of your repository or take ownership in any way, except in rare cases where someone becomes unresponsive after months of contact attempts. As stated, the objective is to share maintenance and avoid "plugin-abandon".

5.6.7 Preparing Pull Requests

Short version

- 1. Fork the repository.
- 2. Fetch tags from upstream if necessary (if you cloned only main git fetch --tags https://github.com/pytest-dev/pytest).
- 3. Enable and install pre-commit to ensure style-guides and code checks are followed.
- 4. Follow PEP-8 for naming.
- 5. Tests are run using tox:

```
tox -e linting,py39
```

The test environments above are usually enough to cover most cases locally.

- 6. Write a changelog entry: changelog/2574.bugfix.rst, use issue id number and one of feature, improvement, bugfix, doc, deprecation, breaking, vendor or trivial for the issue type.
- 7. Unless your change is a trivial or a documentation fix (e.g., a typo or reword of a small section) please add yourself to the AUTHORS file, in alphabetical order.

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Long version

What is a "pull request"? It informs the project's core developers about the changes you want to review and merge. Pull requests are stored on GitHub servers. Once you send a pull request, we can discuss its potential modifications and even add more commits to it later on. There's an excellent tutorial on how Pull Requests work in the GitHub Help Center.

Here is a simple overview, with pytest-specific bits:

- 1. Fork the pytest GitHub repository. It's fine to use pytest as your fork repository name because it will live under your user.
- 2. Clone your fork locally using git and create a branch:

```
$ git clone git@github.com:YOUR_GITHUB_USERNAME/pytest.git
$ cd pytest
$ git fetch --tags https://github.com/pytest-dev/pytest
# now, create your own branch off "main":
    $ git checkout -b your-bugfix-branch-name main
```

Given we have "major.minor.micro" version numbers, bug fixes will usually be released in micro releases whereas features will be released in minor releases and incompatible changes in major releases.

You will need the tags to test locally, so be sure you have the tags from the main repository. If you suspect you don't, set the main repository as upstream and fetch the tags:

```
$ git remote add upstream https://github.com/pytest-dev/pytest
$ git fetch upstream --tags
```

If you need some help with Git, follow this quick start guide: https://git.wiki.kernel.org/index.php/QuickStart

3. Install pre-commit and its hook on the pytest repo:

```
$ pip install --user pre-commit
$ pre-commit install
```

Afterwards pre-commit will run whenever you commit.

https://pre-commit.com/ is a framework for managing and maintaining multi-language pre-commit hooks to ensure code-style and code formatting is consistent.

4. Install tox

Tox is used to run all the tests and will automatically setup virtualenvs to run the tests in. (will implicitly use https://virtualenv.pypa.io/en/latest/):

```
$ pip install tox
```

5. Run all the tests

You need to have Python 3.8 or later available in your system. Now running tests is as simple as issuing this command:

```
$ tox -e linting,py39
```

This command will run tests via the "tox" tool against Python 3.9 and also perform "lint" coding-style checks.

6. You can now edit your local working copy and run the tests again as necessary. Please follow PEP-8 for naming.

You can pass different options to tox. For example, to run tests on Python 3.9 and pass options to pytest (e.g. enter pdb on failure) to pytest you can do:

```
$ tox -e py39 -- --pdb
```

Or to only run tests in a particular test module on Python 3.9:

```
$ tox -e py39 -- testing/test_config.py
```

When committing, pre-commit will re-format the files if necessary.

7. If instead of using tox you prefer to run the tests directly, then we suggest to create a virtual environment and use an editable install with the dev extra:

```
$ python3 -m venv .venv
$ source .venv/bin/activate # Linux
$ .venv/Scripts/activate.bat # Windows
$ pip install -e ".[dev]"
```

Afterwards, you can edit the files and run pytest normally:

```
$ pytest testing/test_config.py
```

- 8. Create a new changelog entry in changelog. The file should be named <issueid>.<type>.rst, where issueid is the number of the issue related to the change and type is one of feature, improvement, bugfix, doc, deprecation, breaking, vendor or trivial. You may skip creating the changelog entry if the change doesn't affect the documented behaviour of pytest.
- 9. Add yourself to AUTHORS file if not there yet, in alphabetical order.
- 10. Commit and push once your tests pass and you are happy with your change(s):

```
$ git commit -a -m "<commit message>"
$ git push -u
```

11. Finally, submit a pull request through the GitHub website using this data:

```
head-fork: YOUR_GITHUB_USERNAME/pytest
compare: your-branch-name

base-fork: pytest-dev/pytest
base: main
```

Writing Tests

Writing tests for plugins or for pytest itself is often done using the pytester fixture, as a "black-box" test.

For example, to ensure a simple test passes you can write:

Alternatively, it is possible to make checks based on the actual output of the termal using glob-like expressions:

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When choosing a file where to write a new test, take a look at the existing files and see if there's one file which looks like a good fit. For example, a regression test about a bug in the --lf option should go into test_cacheprovider.py, given that this option is implemented in cacheprovider.py. If in doubt, go ahead and open a PR with your best guess and we can discuss this over the code.

5.6.8 Joining the Development Team

Anyone who has successfully seen through a pull request which did not require any extra work from the development team to merge will themselves gain commit access if they so wish (if we forget to ask please send a friendly reminder). This does not mean there is any change in your contribution workflow: everyone goes through the same pull-request-and-review process and no-one merges their own pull requests unless already approved. It does however mean you can participate in the development process more fully since you can merge pull requests from other contributors yourself after having reviewed them.

5.6.9 Merge/squash guidelines

When a PR is approved and ready to be integrated to the main branch, one has the option to *merge* the commits unchanged, or *squash* all the commits into a single commit.

Here are some guidelines on how to proceed, based on examples of a single PR commit history:

- 1. Miscellaneous commits:
 - Implement X
 - Fix test_a
 - Add myself to AUTHORS
 - fixup! Fix test_a
 - Update tests/test_integration.py
 - Merge origin/main into PR branch
 - Update tests/test_integration.py

In this case, prefer to use the **Squash** merge strategy: the commit history is a bit messy (not in a derogatory way, often one just commits changes because they know the changes will eventually be squashed together), so squashing everything into a single commit is best. You must clean up the commit message, making sure it contains useful details.

- 2. Separate commits related to the same topic:
 - Implement X
 - Add myself to AUTHORS
 - Update CHANGELOG for X

In this case, prefer to use the **Squash** merge strategy: while the commit history is not "messy" as in the example above, the individual commits do not bring much value overall, specially when looking at the changes a few months/years down the line.

- 3. Separate commits, each with their own topic (refactorings, renames, etc), but still have a larger topic/purpose.
 - Refactor class X in preparation for feature Y
 - Remove unused method
 - Implement feature Y

In this case, prefer to use the **Merge** strategy: each commit is valuable on its own, even if they serve a common topic overall. Looking at the history later, it is useful to have the removal of the unused method separately on its own commit, along with more information (such as how it became unused in the first place).

- 4. Separate commits, each with their own topic, but without a larger topic/purpose other than improve the code base (using more modern techniques, improve typing, removing clutter, etc).
 - Improve internal names in X
 - Add type annotations to Y
 - Remove unnecessary dict access
 - Remove unreachable code due to EOL Python

In this case, prefer to use the **Merge** strategy: each commit is valuable on its own, and the information on each is valuable in the long term.

As mentioned, those are overall guidelines, not rules cast in stone. This topic was discussed in #12633.

Backport PRs (as those created automatically from a backport label) should always be **squashed**, as they preserve the original PR author.

5.6.10 Backporting bug fixes for the next patch release

Pytest makes a feature release every few weeks or months. In between, patch releases are made to the previous feature release, containing bug fixes only. The bug fixes usually fix regressions, but may be any change that should reach users before the next feature release.

Suppose for example that the latest release was 1.2.3, and you want to include a bug fix in 1.2.4 (check https://github.com/pytest-dev/pytest/releases for the actual latest release). The procedure for this is:

1. First, make sure the bug is fixed in the main branch, with a regular pull request, as described above. An exception to this is if the bug fix is not applicable to main anymore.

Automatic method:

Add a backport 1.2.x label to the PR you want to backport. This will create a backport PR against the 1.2.x branch

Manual method:

- 1. git checkout origin/1.2.x -b backport-XXXX # use the main PR number here
- 2. Locate the merge commit on the PR, in the *merged* message, for example:

nicoddemus merged commit 0f8b462 into pytest-dev:main

- 3. git cherry-pick -x -m1 REVISION # use the revision you found above (0f8b462).
- 4. Open a PR targeting 1.2.x:
 - Prefix the message with [1.2.x].

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• Delete the PR body, it usually contains a duplicate commit message.

Who does the backporting

As mentioned above, bugs should first be fixed on main (except in rare occasions that a bug only happens in a previous release). So, who should do the backport procedure described above?

- 1. If the bug was fixed by a core developer, it is the main responsibility of that core developer to do the backport.
- 2. However, often the merge is done by another maintainer, in which case it is nice of them to do the backport procedure if they have the time.
- 3. For bugs submitted by non-maintainers, it is expected that a core developer will to do the backport, normally the one that merged the PR on main.
- 4. If a non-maintainers notices a bug which is fixed on main but has not been backported (due to maintainers forgetting to apply the *needs backport* label, or just plain missing it), they are also welcome to open a PR with the backport. The procedure is simple and really helps with the maintenance of the project.

All the above are not rules, but merely some guidelines/suggestions on what we should expect about backports.

Backports should be **squashed** (rather than **merged**), as doing so preserves the original PR author correctly.

5.6.11 Handling stale issues/PRs

Stale issues/PRs are those where pytest contributors have asked for questions/changes and the authors didn't get around to answer/implement them yet after a somewhat long time, or the discussion simply died because people seemed to lose interest.

There are many reasons why people don't answer questions or implement requested changes: they might get busy, lose interest, or just forget about it, but the fact is that this is very common in open source software.

The pytest team really appreciates every issue and pull request, but being a high-volume project with many issues and pull requests being submitted daily, we try to reduce the number of stale issues and PRs by regularly closing them. When an issue/pull request is closed in this manner, it is by no means a dismissal of the topic being tackled by the issue/pull request, but it is just a way for us to clear up the queue and make the maintainers' work more manageable. Submitters can always reopen the issue/pull request in their own time later if it makes sense.

When to close

Here are a few general rules the maintainers use deciding when to close issues/PRs because of lack of inactivity:

- Issues labeled question or needs information: closed after 14 days inactive.
- Issues labeled proposal: closed after six months inactive.
- Pull requests: after one month, consider pinging the author, update linked issue, or consider closing. For pull requests which are nearly finished, the team should consider finishing it up and merging it.

The above are **not hard rules**, but merely **guidelines**, and can be (and often are!) reviewed on a case-by-case basis.

Closing pull requests

When closing a Pull Request, it needs to be acknowledging the time, effort, and interest demonstrated by the person which submitted it. As mentioned previously, it is not the intent of the team to dismiss a stalled pull request entirely but to merely to clear up our queue, so a message like the one below is warranted when closing a pull request that went stale:

Hi <contributor>,

First of all, we would like to thank you for your time and effort on working on this, the pytest team deeply appreciates it.

We noticed it has been awhile since you have updated this PR, however. pytest is a high activity project, with many issues/PRs being opened daily, so it is hard for us maintainers to track which PRs are ready for merging, for review, or need more attention.

So for those reasons we, think it is best to close the PR for now, but with the only intention to clean up our queue, it is by no means a rejection of your changes. We still encourage you to re-open this PR (it is just a click of a button away) when you are ready to get back to it.

Again we appreciate your time for working on this, and hope you might get back to this at a later time!

<bye>

5.6.12 Closing issues

When a pull request is submitted to fix an issue, add text like closes #XYZW to the PR description and/or commits (where XYZW is the issue number). See the GitHub docs for more information.

When an issue is due to user error (e.g. misunderstanding of a functionality), please politely explain to the user why the issue raised is really a non-issue and ask them to close the issue if they have no further questions. If the original requester is unresponsive, the issue will be handled as described in the section *Handling stale issues/PRs* above.

5.7 Development Guide

The contributing guidelines are to be found *here*. The release procedure for pytest is documented on GitHub.

5.8 Sponsor

pytest is maintained by a team of volunteers from all around the world in their free time. While we work on pytest because we love the project and use it daily at our daily jobs, monetary compensation when possible is welcome to justify time away from friends, family and personal time.

Money is also used to fund local sprints, merchandising (stickers to distribute in conferences for example) and every few years a large sprint involving all members.

5.8.1 OpenCollective

Open Collective is an online funding platform for open and transparent communities. It provide tools to raise money and share your finances in full transparency.

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See more details in the pytest collective.

5.9 pytest for enterprise

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5.11 Contact channels

5.11.1 Web

- pytest issue tracker to report bugs or suggest features.
- pytest discussions at GitHub for general questions.
- pytest on stackoverflow.com to post precise questions with the tag pytest. New questions will usually be seen by pytest users or developers and answered quickly.

5.11.2 Chat

- pytest discord server for pytest development visibility and general assistance.
- #pytest on irc.libera.chat IRC channel for random questions (using an IRC client, or via webchat)
- #pytest on Matrix.

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5.11.3 Mail

- Testing In Python: a mailing list for Python testing tools and discussion.
- pytest-dev at python.org a mailing list for pytest specific announcements and discussions.
- Mail to core@pytest.org for topics that cannot be discussed in public. Mails sent there will be distributed among the members in the pytest core team, who can also be contacted individually:
 - Bruno Oliveira (@nicoddemus, bruno@pytest.org)
 - Florian Bruhin (@The-Compiler, florian@pytest.org)
 - Pierre Sassoulas (@Pierre-Sassoulas, pierre@pytest.org)
 - Ran Benita (@bluetech, ran@pytest.org)
 - Ronny Pfannschmidt (@RonnyPfannschmidt, ronny@pytest.org)
 - Zac Hatfield-Dodds (@Zac-HD, zac@pytest.org)

5.11.4 Other

- The contribution guide for help on submitting pull requests to GitHub.
- Florian Bruhin (@The-Compiler) offers pytest professional teaching and consulting via Bruhin Software.

5.12 History

pytest has a long and interesting history. The first commit in this repository is from January 2007, and even that commit alone already tells a lot: The repository originally was from the py library (later split off to pytest), and it originally was a SVN revision, migrated to Mercurial, and finally migrated to git.

However, the commit says "create the new development trunk" and is already quite big: 435 files changed, 58640 insertions(+). This is because pytest originally was born as part of PyPy, to make it easier to write tests for it. Here's how it evolved from there to its own project:

- Late 2002 / early 2003, PyPy was born.
- Like that blog post mentioned, from very early on, there was a big focus on testing. There were various testsupport files on top of unittest.py, and as early as June 2003, Holger Krekel (@hpk42) refactored its test framework to clean things up (pypy.tool.test, but still on top of unittest.py, with nothing pytest-like yet).
- In December 2003, there was another iteration at improving their testing situation, by Stefan Schwarzer, called pypy.tool.newtest.
- However, it didn't seem to be around for long, as around June/July 2004, efforts started on a thing called utest, offering plain assertions. This seems like the start of something pytest-like, but unfortunately, it's unclear where the test runner's code was at the time. The closest thing still around is this file, but that doesn't seem like a complete test runner at all. What can be seen is that there were various efforts by Laura Creighton and Samuele Pedroni (@pedronis) at automatically converting existing tests to the new utest framework.
- Around the same time, for Europython 2004, @hpk42 started a project originally called "std", intended to be a "complementary standard library" already laying out the principles behind what later became pytest:
 - current "batteries included" are very useful, but
 - * some of them are written in a pretty much java-like style, especially the unittest-framework
 - * [...]

* the best API is one that doesn't exist

[...]

- a testing package should require as few boilerplate code as possible and offer much flexibility
- it should provide premium quality tracebacks and debugging aid

[...]

- first of all ... forget about limited "assertXYZ APIs" and use the real thing, e.g.:

```
assert x == y
```

- this works with plain python but you get unhelpful "assertion failed" errors with no information
- std.utest (magic!) actually reinterprets the assertion expression and offers detailed information about underlying values
- In September 2004, the py-dev mailinglist gets born, which is now pytest-dev, but thankfully with all the original archives still intact.
- Around September/October 2004, the std project was renamed to py and std.utest became py.test. This is also the first time the entire source code, seems to be available, with much of the API still being around today:
 - py.path.local, which is being phased out of pytest (in favour of pathlib) some 16-17 years later
 - The idea of the collection tree, including Collector, FSCollector, Directory, PyCollector, Module, Class
 - Arguments like -x/--exitfirst, -l/--showlocals, --fulltrace, --pdb, -S/--nocapture (-s/--capture=off today), --collectonly (--collect-only today)
- In the same month, the py library gets split off from PyPy
- It seemed to get rather quiet for a while, and little seemed to happen between October 2004 (removing py from PyPy) and January 2007 (first commit in the now-pytest repository). However, there were various discussions about features/ideas on the mailinglist, and a couple of releases every couple of months:
 - March 2006: py 0.8.0-alpha2
 - May 2007: py 0.9.0
 - March 2008: py 0.9.1 (first release to be found in the pytest changelog!)
 - August 2008: py 0.9.2
- In August 2009, py 1.0.0 was released, introducing a lot of fundamental features:
 - funcargs/fixtures
 - A plugin architecture which still looks very much the same today!
 - Various default plugins, including monkeypatch
- Even back there, the FAO said:

Clearly, [a second standard library] was ambitious and the naming has maybe haunted the project rather than helping it. There may be a project name change and possibly a split up into different projects sometime.

and that finally happened in November 2010, when pytest 2.0.0 was released as a package separate from py (but still called py.test).

• In August 2016, pytest 3.0.0 was released, which adds pytest (rather than py.test) as the recommended command-line entry point

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Due to this history, it's difficult to answer the question when pytest was started. It depends what point should really be seen as the start of it all. One possible interpretation is to pick Europython 2004, i.e. around June/July 2004.

5.13 Historical Notes

This page lists features or behavior from previous versions of pytest which have changed over the years. They are kept here as a historical note so users looking at old code can find documentation related to them.

5.13.1 Marker revamp and iteration

Changed in version 3.6.

pytest's marker implementation traditionally worked by simply updating the __dict__ attribute of functions to cumulatively add markers. As a result, markers would unintentionally be passed along class hierarchies in surprising ways. Further, the API for retrieving them was inconsistent, as markers from parameterization would be stored differently than markers applied using the <code>@pytest.mark</code> decorator and markers added via <code>node.add_marker</code>.

This state of things made it technically next to impossible to use data from markers correctly without having a deep understanding of the internals, leading to subtle and hard to understand bugs in more advanced usages.

Depending on how a marker got declared/changed one would get either a MarkerInfo which might contain markers from sibling classes, MarkDecorators when marks came from parameterization or from a node.add_marker call, discarding prior marks. Also MarkerInfo acts like a single mark, when it in fact represents a merged view on multiple marks with the same name.

On top of that markers were not accessible in the same way for modules, classes, and functions/methods. In fact, markers were only accessible in functions, even if they were declared on classes/modules.

A new API to access markers has been introduced in pytest 3.6 in order to solve the problems with the initial design, providing the _pytest.nodes.Node.iter_markers() method to iterate over markers in a consistent manner and reworking the internals, which solved a great deal of problems with the initial design.

Updating code

The old Node.get_marker(name) function is considered deprecated because it returns an internal MarkerInfo object which contains the merged name, *args and **kwargs of all the markers which apply to that node.

In general there are two scenarios on how markers should be handled:

1. Marks overwrite each other. Order matters but you only want to think of your mark as a single item. E.g. log_level('info') at a module level can be overwritten by log_level('debug') for a specific test.

In this case, use Node.get_closest_marker(name):

```
# replace this:
marker = item.get_marker("log_level")
if marker:
    level = marker.args[0]

# by this:
marker = item.get_closest_marker("log_level")
if marker:
    level = marker.args[0]
```

2. Marks compose in an additive manner. E.g. skipif (condition) marks mean you just want to evaluate all of them, order doesn't even matter. You probably want to think of your marks as a set here.

In this case iterate over each mark and handle their *args and **kwargs individually.

```
# replace this
skipif = item.get_marker("skipif")
if skipif:
    for condition in skipif.args:
        # eval condition
        ...

# by this:
for skipif in item.iter_markers("skipif"):
    condition = skipif.args[0]
    # eval condition
```

If you are unsure or have any questions, please consider opening an issue.

Related issues

Here is a non-exhaustive list of issues fixed by the new implementation:

- Marks don't pick up nested classes (#199).
- Markers stain on all related classes (#568).
- Combining marks args and kwargs calculation (#2897).
- request.node.get_marker('name') returns None for markers applied in classes (#902).
- Marks applied in parametrize are stored as markdecorator (#2400).
- Fix marker interaction in a backward incompatible way (#1670).
- Refactor marks to get rid of the current "marks transfer" mechanism (#2363).
- Introduce FunctionDefinition node, use it in generate_tests (#2522).
- Remove named marker attributes and collect markers in items (#891).
- skipif mark from parametrize hides module level skipif mark (#1540).
- skipif + parametrize not skipping tests (#1296).
- Marker transfer incompatible with inheritance (#535).

More details can be found in the original PR.



in a future major release of pytest we will introduce class based markers, at which point markers will no longer be limited to instances of Mark.

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5.13.2 cache plugin integrated into the core

The functionality of the *core cache* plugin was previously distributed as a third party plugin named pytest-cache. The core plugin is compatible regarding command line options and API usage except that you can only store/receive data between test runs that is json-serializable.

5.13.3 funcargs and pytest_funcarg___

In versions prior to 2.3 there was no @pytest.fixture marker and you had to use a magic pytest_funcarg__NAME prefix for the fixture factory. This remains and will remain supported but is not anymore advertised as the primary means of declaring fixture functions.

5.13.4 @pytest.yield_fixture decorator

Prior to version 2.10, in order to use a <code>yield</code> statement to execute teardown code one had to mark a fixture using the <code>yield_fixture</code> marker. From 2.10 onward, normal fixtures can use <code>yield</code> directly so the <code>yield_fixture</code> decorator is no longer needed and considered deprecated.

5.13.5 [pytest] header in setup.cfg

Prior to 3.0, the supported section name was [pytest]. Due to how this may collide with some distutils commands, the recommended section name for setup.cfg files is now [tool:pytest].

Note that for pytest.ini and tox.ini files the section name is [pytest].

5.13.6 Applying marks to @pytest.mark.parametrize parameters

Prior to version 3.1 the supported mechanism for marking values used the syntax:

```
import pytest

@pytest.mark.parametrize(
    "test_input,expected", [("3+5", 8), ("2+4", 6), pytest.mark.xfail(("6*9", 42))]
)
def test_eval(test_input, expected):
    assert eval(test_input) == expected
```

This was an initial hack to support the feature but soon was demonstrated to be incomplete, broken for passing functions or applying multiple marks with the same name but different parameters.

The old syntax is planned to be removed in pytest-4.0.

5.13.7 @pytest.mark.parametrize argument names as a tuple

In versions prior to 2.4 one needed to specify the argument names as a tuple. This remains valid but the simpler "name1, name2, ..." comma-separated-string syntax is now advertised first because it's easier to write and produces less line noise.

5.13.8 setup: is now an "autouse fixture"

During development prior to the pytest-2.3 release the name pytest.setup was used but before the release it was renamed and moved to become part of the general fixture mechanism, namely *Autouse fixtures (fixtures you don't have to request)*

5.13.9 Conditions as strings instead of booleans

Prior to pytest-2.4 the only way to specify skipif/xfail conditions was to use strings:

```
import sys

@pytest.mark.skipif("sys.version_info >= (3,3)")
def test_function(): ...
```

During test function setup the skipif condition is evaluated by calling eval('sys.version_info >= (3,0)', namespace). The namespace contains all the module globals, and os and sys as a minimum.

Since pytest-2.4 *boolean conditions* are considered preferable because markers can then be freely imported between test modules. With strings you need to import not only the marker but all variables used by the marker, which violates encapsulation.

The reason for specifying the condition as a string was that pytest can report a summary of skip conditions based purely on the condition string. With conditions as booleans you are required to specify a reason string.

Note that string conditions will remain fully supported and you are free to use them if you have no need for cross-importing markers.

The evaluation of a condition string in pytest.mark.skipif(conditionstring) or pytest.mark. xfail(conditionstring) takes place in a namespace dictionary which is constructed as follows:

- the namespace is initialized by putting the sys and os modules and the pytest config object into it.
- updated with the module globals of the test function for which the expression is applied.

The pytest config object allows you to skip based on a test configuration value which you might have added:

```
@pytest.mark.skipif("not config.getvalue('db')")
def test_function(): ...
```

The equivalent with "boolean conditions" is:

```
@pytest.mark.skipif(not pytest.config.getvalue("db"), reason="--db was not specified")
def test_function():
    pass
```

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You cannot use pytest.config.getvalue() in code imported before pytest's argument parsing takes place. For example, conftest.py files are imported before command line parsing and thus config.getvalue() will not execute correctly.

5.13.10 pytest.set_trace()

Previous to version 2.4 to set a break point in code one needed to use pytest.set_trace():

```
def test_function():
    ...
    pytest.set_trace() # invoke PDB debugger and tracing
```

This is no longer needed and one can use the native import pdb; pdb.set_trace() call directly.

For more details see breakpoints.

5.13.11 "compat" properties

Access of Module, Function, Class, Instance, File and Item through Node instances have long been documented as deprecated, but started to emit warnings from pytest 3.9 and onward.

Users should just import pytest and access those objects using the pytest module.

5.14 Talks and Tutorials

5.14.1 Books

- pytest Quick Start Guide, by Bruno Oliveira (2018).
- Python Testing with pytest, by Brian Okken (2017).
- Python Testing with pytest, Second Edition, by Brian Okken (2022).

5.14.2 Talks and blog postings

- Training: pytest simple, rapid and fun testing with Python, Florian Bruhin, PyConDE 2022
- pytest: Simple, rapid and fun testing with Python, (@ 4:22:32), Florian Bruhin, WeAreDevelopers World Congress 2021
- Webinar: pytest: Test Driven Development für Python (German), Florian Bruhin, via mylearning.ch, 2020
- Webinar: Simplify Your Tests with Fixtures, Oliver Bestwalter, via JetBrains, 2020
- Training: Introduction to pytest simple, rapid and fun testing with Python, Florian Bruhin, PyConDE 2019
- Abridged metaprogramming classics this episode: pytest, Oliver Bestwalter, PyConDE 2019 (repository, recording)

- Testing PySide/PyQt code easily using the pytest framework, Florian Bruhin, Qt World Summit 2019 (slides, recording)
- pytest: recommendations, basic packages for testing in Python and Django, Andreu Vallbona, PyBCN June 2019.
- pytest: recommendations, basic packages for testing in Python and Django, Andreu Vallbona, PyconES 2017 (slides in english, video in spanish)
- pytest advanced, Andrew Svetlov (Russian, PyCon Russia, 2016).
- Pythonic testing, Igor Starikov (Russian, PyNsk, November 2016).
- pytest Rapid Simple Testing, Florian Bruhin, Swiss Python Summit 2016.
- Improve your testing with Pytest and Mock, Gabe Hollombe, PyCon SG 2015.
- Introduction to pytest, Andreas Pelme, EuroPython 2014.
- Advanced Uses of py.test Fixtures, Floris Bruynooghe, EuroPython 2014.
- Why i use py.test and maybe you should too, Andy Todd, Pycon AU 2013
- 3-part blog series about pytest from @pydanny alias Daniel Greenfeld (January 2014)
- pytest: helps you write better Django apps, Andreas Pelme, DjangoCon Europe 2014.
- Testing Django Applications with pytest, Andreas Pelme, EuroPython 2013.
- Testes pythonics com py.test, Vinicius Belchior Assef Neto, Plone Conf 2013, Brazil.
- Introduction to py.test fixtures, FOSDEM 2013, Floris Bruynooghe.
- pytest feature and release highlights, Holger Krekel (GERMAN, October 2013)
- pytest introduction from Brian Okken (January 2013)
- pycon australia 2012 pytest talk from Brianna Laugher (video, slides, code)
- pycon 2012 US talk video from Holger Krekel
- monkey patching done right (blog post, consult monkeypatch plugin for up-to-date API)

Test parametrization:

- generating parametrized tests with fixtures.
- · test generators and cached setup
- parametrizing tests, generalized (blog post)
- putting test-hooks into local or global plugins (blog post)

Assertion introspection:

• (07/2011) Behind the scenes of pytest's new assertion rewriting

Distributed testing:

• simultaneously test your code on all platforms (blog entry)

Plugin specific examples:

- skipping slow tests by default in pytest (blog entry)
- many examples in the docs for plugins

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